

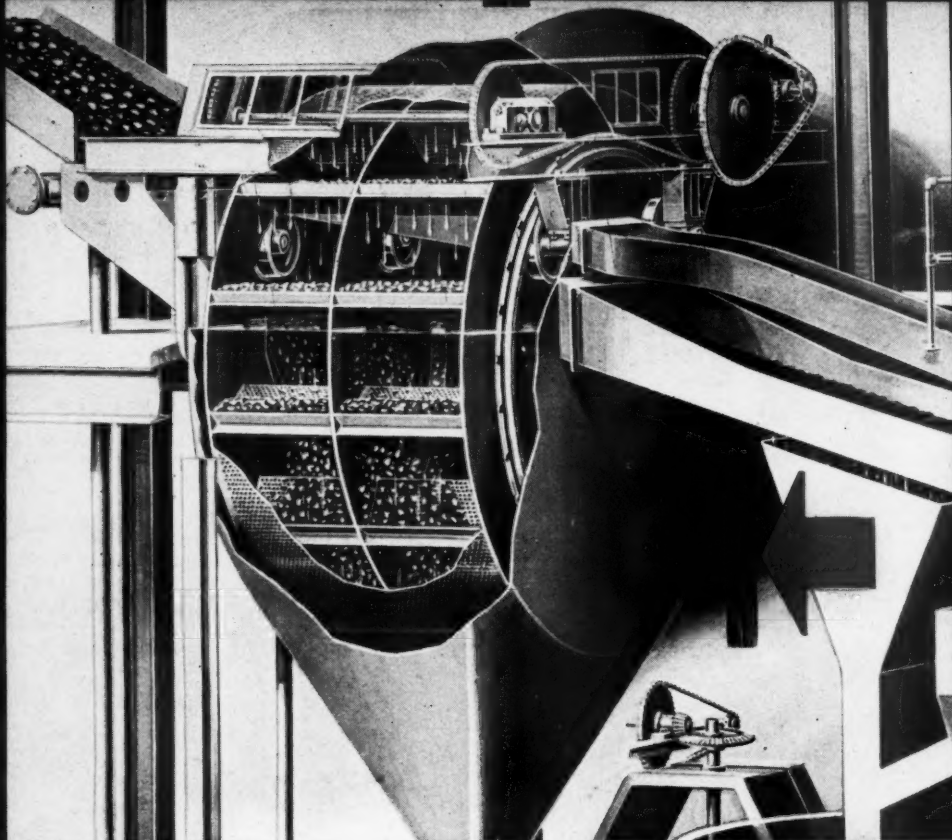
Mining

CONGRESS JOURNAL



JULY
1949





REPORT on the FIRST LINK-BELT Heavy-Media Concentrator Installation

Pittsburgh Coal Co. adds another unit

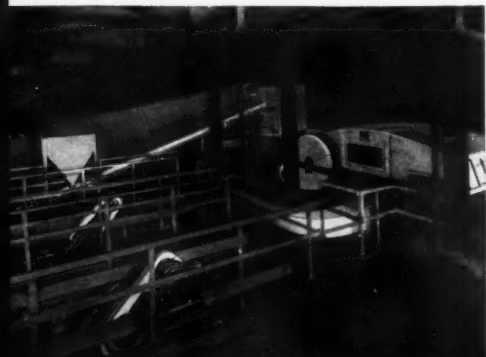
The first Link-Belt Float-Sink Concentrator installation for Heavy-Media coal cleaning was made on a pilot or experimental basis for the Pittsburgh Coal Company early in 1946. This worked out so well that it was subsequently put into full scale commercial operation. This original Link-Belt Concentrator is effectively cleaning 250 tons per hour of washery middlings on a double shift basis. This unit greatly increased the overall plant capacity, raised its efficiency, cut costs and improved the marketability of the products.

Pittsburgh Coal Company has now installed a second Link-Belt Float-Sink Concentrator at the same operation to clean 8" x 3" egg size coal. This unit replaces

a picking operation and does the job more uniformly, more efficiently and at a greatly reduced cost. Coal is received by the Concentrator directly from the R.O.M. shaker screen, is cleaned, rinsed and dewatered in the space formerly occupied by the picking table.

For complete information about this and other Link-Belt Heavy-Media installations, get in touch with our nearest office.

- Lower cleaning cost
- Eliminates the picking operation
- Improves marketability of coal through better quality
- Greater plant capacity in same space
- Higher efficiency



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11,534

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**Engineered
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LINK-BELT

Operators Asked for It— Now, Sanford-Day Builds It

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SEALED "AUTOMATIC"



Some mines report spending thousands of dollars annually in cleaning coal dust from track beds. Now is a good time for operators using drop bottom cars to analyze this cost item. Whether it is \$5,000, \$2,000 or any cost at all, it is too much when you can have dust-free tracks with S-D Completely Sealed "Automatics." S-D "Automatics" are now 100% dust sealed, even at the wheel hoods. A "Dust Roof Seal" has been provided by a sill and door structure that permits lengthening the car side to bridge necessary clearance space between the drop bottom door and the car frame. Thus, instead of the dust dribbling out through these unprotected spaces onto the tracks it is carried over and deposited on the bottom of the door where it stays until it is dumped in the bin with the coal. With their long-life construction, big capacity, automatic "Jerkout" unlatching device, and now, completely sealed against dust leakage, S-D "Automatics" continue to be the No. 1 mine car in the industry. With the new COMPLETELY SEALED feature, S-D "Automatics" are now of even greater importance to profitable coal mine operation. Let one of our engineers discuss these outstanding cars with you.

20 Car loads of "Automatics" from—

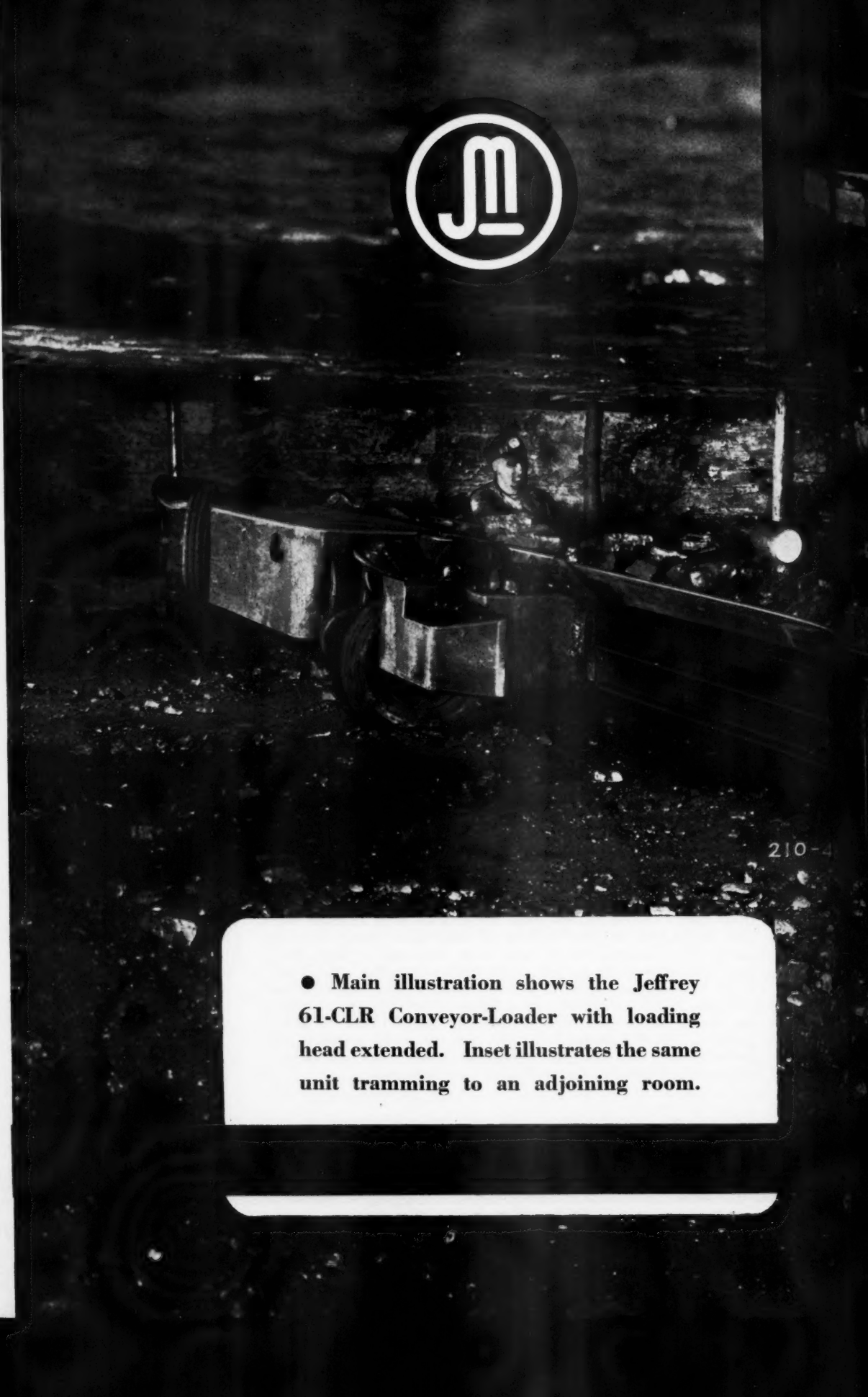


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210-4

● Main illustration shows the Jeffrey 61-CLR Conveyor-Loader with loading head extended. Inset illustrates the same unit tramming to an adjoining room.





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drilled 35 times longer
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**"25% MORE FOOTAGE
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Published Monthly. Yearly subscriptions, United States, Canada, Central and South America, \$3.00. Foreign, \$5.00. Single copies, \$0.30. February Annual Review Issue, \$1.00. Entered as Second-class Matter, January 30, 1915, at the Post Office at Washington, D. C.



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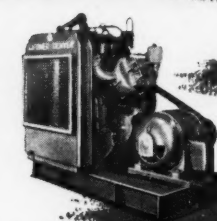
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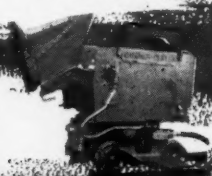
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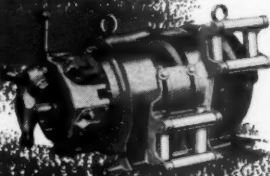
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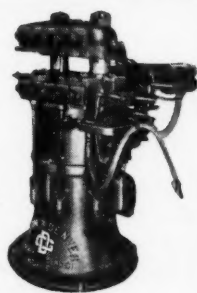
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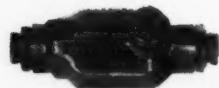
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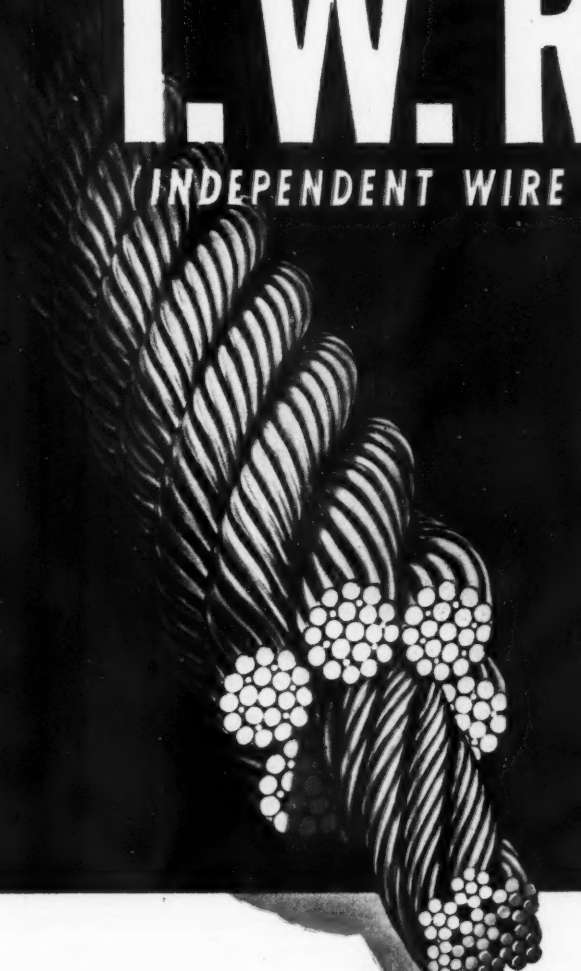




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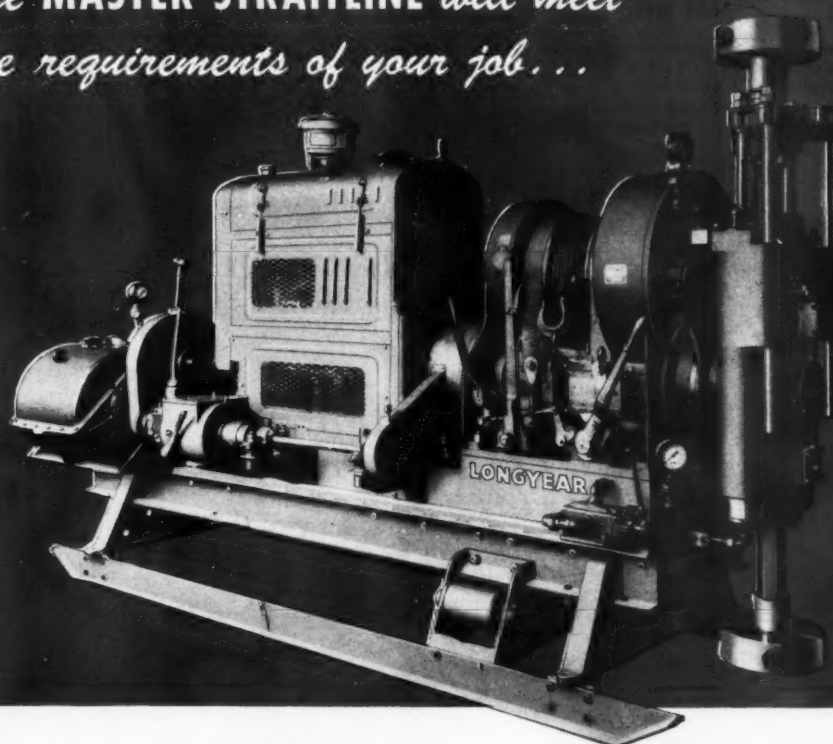
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This powerful Longyear model is a self-contained, completely equipped assembly ready for action on your job. Strength and endurance are built into the drill, resulting in steady performance. Drilling and upkeep costs remain low. The Master has a rated capacity of 4250' of 1½" core. Larger cores may be recovered, but to somewhat lesser depths.

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JIM and TIM . . . the Mining GRIM-lins

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A MINES PLANNED *S. C. C. LAYOUT WITH SAFETY GROUND TRIP PROTECTS MEN AND MACHINES

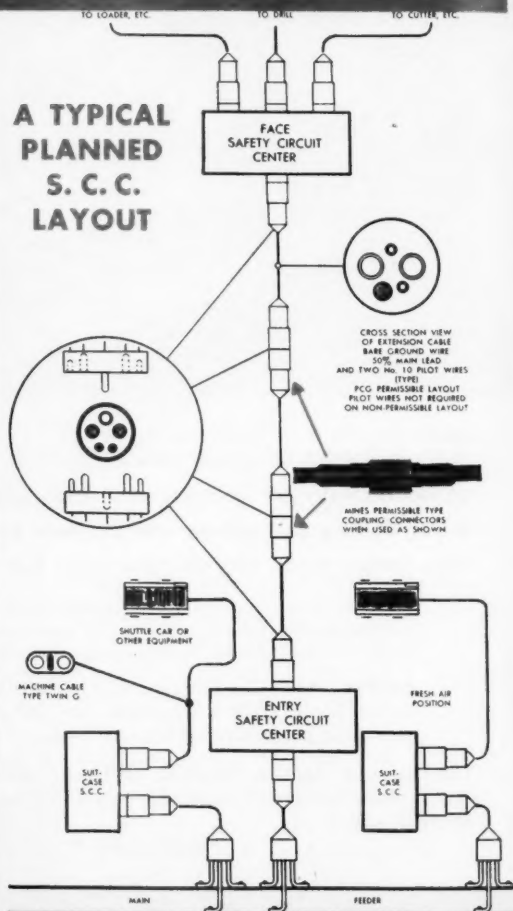
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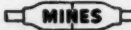
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NH-6 200 hp

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The extra strength of "Nitramex" (approximating that of 75% Gelatin) frequently allows wider drill hole spacing with consequent reduction of drilling costs.

They are both insensitive to blasting caps, friction, or the impact of falling objects. Even rifle bullets won't detonate them. And yet, a "Nitramon" Primer—itsself relatively insensitive—dependably fires large or small charges. No safer blasting agents are known.

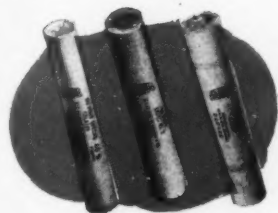
Packed in rugged metal, watertight containers—"Nitramon" and "Nitramex" may be safely loaded far in advance of firing time. Another feature: they're non-headache-producing... an advantage in hot weather. Ask any Du Pont Explosives representative for complete information.

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underground
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DU PONT SPECIAL GELATIN

Popular, high velocity dynamite of excellent water-resisting characteristics. It's plastic... cohesive... easily tamped... stays put in uppers. Best obtainable fumes.

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DU PONT "GELEX"***

This semi-gelatinous dynamite is widely used and economically meets almost all requirements. Has ample strength to break up all but the very hardest rock. Fumes are very good.

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DU PONT "EXTRA" DYNAMITES

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†Reg. Trade-Mark for nitrocarbonitrile blasting agent.

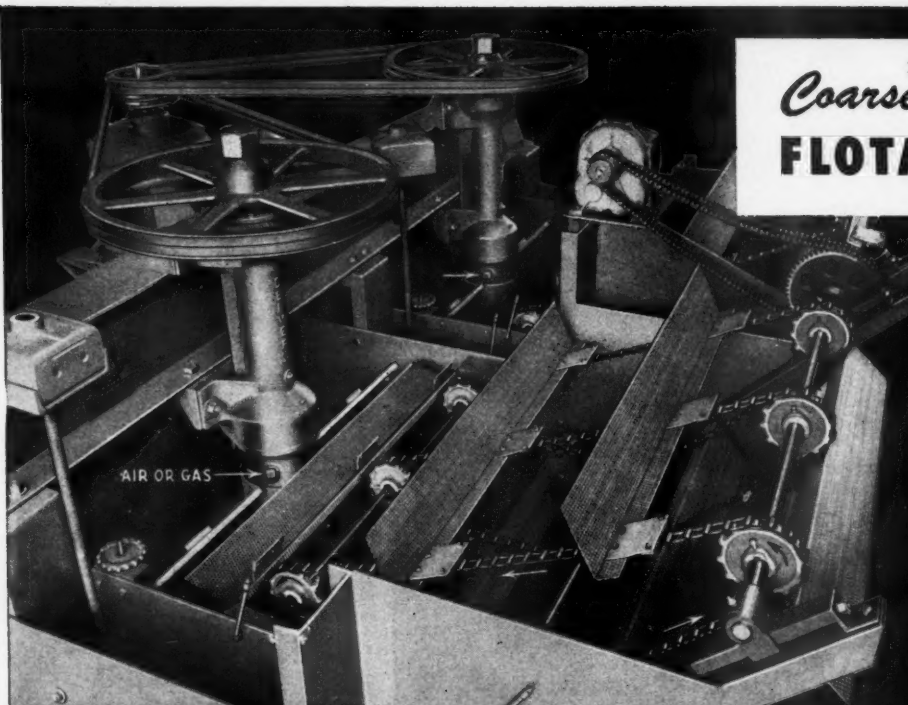
*Trade-Mark for Du Pont ammonium nitrate blasting agent

**Trade-Mark Reg. U. S. Pat. Off.



BETTER THINGS FOR BETTER LIVING

... THROUGH CHEMISTRY



Coarse* COAL FLOTATION

Working directly with the Bureau of Mines Coal Preparation Section, and with large coal companies engaged in solving the problem, Denver Flotation Engineers designed a Flotation Machine which does an effective job of coal cleaning as will be noted in the tabulations below from Bureau of Mines Report of Investigations 4306, July 1948.

Marketable results are obtained on varying types, grades and sizes of coal fractions.

with DENVER "SUB-A" FLOTATION MACHINES

PROBLEM • Treating coal fractions from 1/16"-0. Two objectives are sought—

- 1) to save marketable grade of coal in these sizes and
- 2) eliminate stream pollution from wasted slurry water.

These coal fractions cannot be satisfactorily cleaned by "gravity" methods. With flotation remaining as the most acceptable solution, a prime consideration is that the flotation machine used must be capable of handling both coarse and fine sizes effectively. The rapid rising, dense agglomerate type "matte" coal concentrate must be removed and dewatered in large volume.

SOLUTION • No commercial flotation machine can treat both coarse and fine sizes so effectively as the Denver "Sub-A." This selective feature plus its extreme mechanical and metallurgical flexibility makes it the logical choice for coal cleaning work.

Removal and dewatering of the dense agglomerated "matte" concentrate was accomplished with special "deep-digging" punched plate rakes which carry the 7"-8" coal matte up the spitzkasten allowing surplus water to drain back in the pulp through the perforated rakes. Further dewatering is carried out in a wedge bar compression screw conveyor. Surplus water returns via middling feed pipe to the Denver "Sub-A" Flotation cell for re-use, thus eliminating surplus slurry water.

	SCREEN SIZE, MESH	FEED		CLEANED COAL		REFUSE		DISTRIBUTION, %		Reagents, lbs. per ton feed
		Weight, percent	Ash, 1* percent	Weight, percent	Ash, 1* percent	Weight, percent	Ash, 1* percent	Cleaned Coal	Refuse	
MINE I *	10 to 14	18.8	11.9	23.0	6.2	9.1	31.6	77.6	22.4	Kerosene, 3.27
	14 to 35	51.4	19.1	56.0	7.6	31.9	65.3	80.1	19.9	B-23 Frother, 0.24
	35 to 100	23.3	40.3	17.0	13.4	35.6	81.8	60.7	39.3	Pine Oil, 0.11
	Through 100	6.5	58.3	4.0	19.3	23.4	84.0	39.7	60.3	
	Composite through 10	100.0	25.2	100.0	8.7	100.0	72.5	74.1	25.9	
MINE II *	10 to 35	64.2	10.5	58.2	3.4	54.0	50.7	85.0	15.0	Kerosene, 3.46
	35 to 100	22.6	10.5	26.9	4.6	22.2	66.2	90.4	9.6	B-23 Frother, 0.26
	Through 100	13.2	12.8	14.9	6.3	23.8	64.8	88.9	11.1	Pine Oil, 0.20
	Composite through 10	100.0	10.8	100.0	4.2	100.0	57.5	87.6	12.4	

1*—Moisture free basis

CONSULT WITH YOUR DENVER "FLOTATION ENGINEERS"



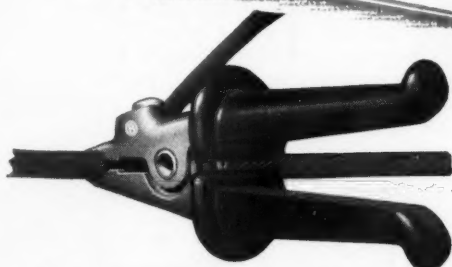
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- 1** Tight mechanical connections to rail, rail bond or negative feeder prevent power leakage.
- 2** Full current-carrying capacity helps keep your electrical system in balance.
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- 4** Clamps for all types of grounding—rail, rail bond and negative feeder—are easy and quick to connect.
- 5** Fully insulated handles protect against shock.



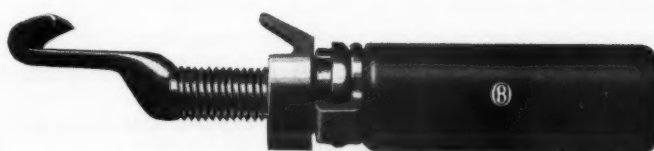
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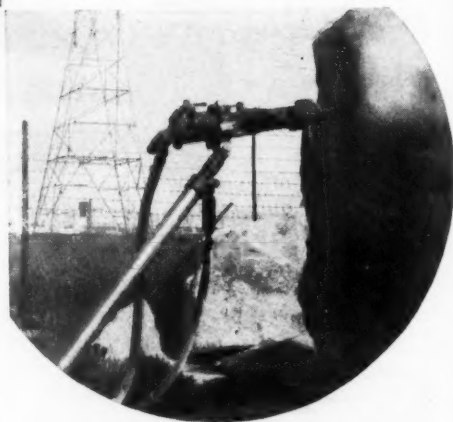
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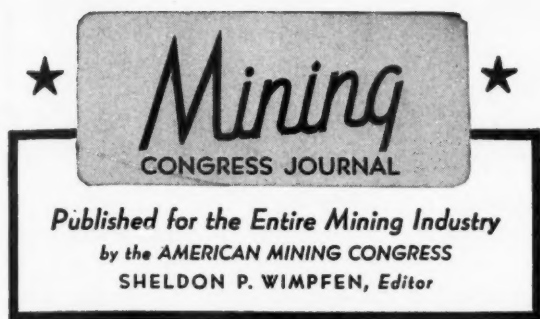
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VOLUME 35

JULY, 1949

NUMBER 7

Bungled Victory

THROUGH their refusal to abide by the law of the land, officials of the CIO International Union of Mine, Mill and Smelter Workers have "won" for their adherents a costly victory. Their perverse unwillingness to sign the non-Communist affidavits called for under the existing labor law has resulted in what may be the permanent closure of American Zinc, Lead & Smelting Co.'s Fairmont City, Ill., smelter.

Before the strike was called last August, the company, in an effort to keep the plant in operation, stated to union officials that the management was willing to continue operations after the expiration of the contract. This proposal was made in the hope that the union's leadership would permit its members to work under the same conditions as its international officers were permitting in Utah and Nevada, where a large number of the union members have been working since July 1948, without a contract. By this arrangement, steady employment at good wages would have been possible until union policy recognized that compliance with the law was essential.

An official committee of the CIO, appointed by Philip Murray, investigated the IUMMSW and issued a report in May 1947, stating that certain leaders of that union were continuously dealing with representatives of the Communist party and were seeking to organize union members into the party. More than 100 locals have seceded from this union over the Communist issue.

In its "militant" program at the Fairmont City plant, the IUMMSW carried on underhanded activity to keep the working force in constant turmoil by stirring up groundless grievances, making numerous unreasonable rate adjustment demands, encouraging insubordination, engaging in slow-downs and stoppages without justifiable cause, plus numerous other devices to demoralize employee-management relations.

Violence and intimidation, coercion and mass picketing have marked the strike period. But, with the belief that the majority of its employees are good Americans under the influence, or intimidated by, a well-organized disloyal minority, the company kept the idle furnaces hot for more than ten months in the patient hope that the national leaders of the union would fulfill the requirements of the law, or step aside in favor of leaders who would. An estimated \$1,000,000 property damage and steady employment for 500 men was at stake, plus a considerable portion of the nation's slab zinc production capacity.

In a recent NLRB election, the majority of the local membership, in a close vote, held with their leaders and

refused to accept an offer of the Progressive Metal Workers Council to represent them in an attempt at settlement. Eleven days later the company "pulled the fires" in its furnaces and sent termination notices to approximately 500 employees. Thereafter the regional director of the NLRB set aside the results of the election because "Mine Mill agents' actions . . . in checking clock numbers near the polling place during the election created an atmosphere that tended to restrain and coerce the voters."

The company has since announced that those furnaces not damaged beyond ordinary repair will be operated if the men return to work immediately. The persistent calmness of the management in the face of these trying difficulties may, we hope, succeed in salvaging both the material plant and the minds of their employees from permanent damage by the IUMMSW.

Dangerous Monopoly

MONOPOLISTIC control over the working force that mans the coal mines is in effect because of the exemption of "the labor of a human being" from the antitrust prohibitions of the Clayton Act. As periodic upheavals consistently disrupt coal production it becomes obvious that this exemption threatens enterprise and initiative and exerts a potent force towards economic instability.

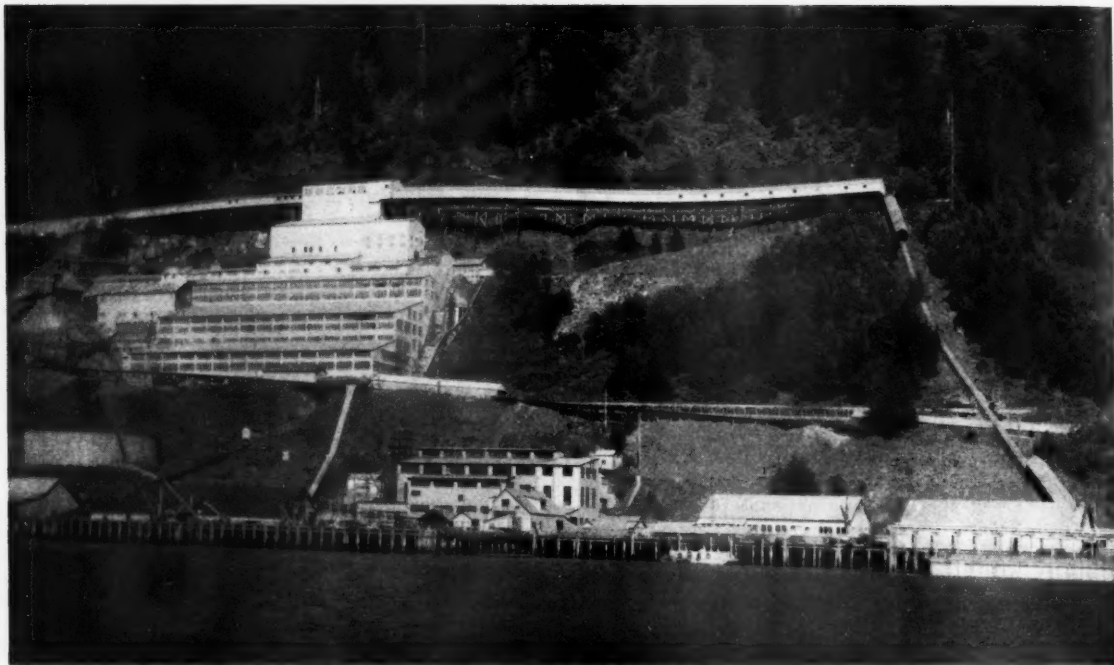
The complete control of the workers in the coal mining industry gave UMW leaders the effrontery to tell management that the matter of one dime, two, three, or four per ton of coal for the operators' contribution to the union health and welfare fund was academic; that whatever it was, had to and would be paid by the industry. Thus, a tax now amounting to 20c a ton and not legitimately a cost of production is imposed on all coal users.

Payments from this fund approximate \$12,000,000 per month. With fund reserves of only \$25,000,000, union officials are said to be seeking an increase in the royalty to 40c a ton. It is understood they are asking that coal mines operate on an equal work-week basis in order that all union members may be enabled to participate equally in the pension fund. Latest development is the order to union members to work only three days a week.

Previous indiscriminate union action has worked a hardship on coal producers and users. The price has been pushed to levels at which some consumers have found the use of coal uneconomic. This, and the constant threat of strike-caused shortages, have turned many consumers to other fuels. The three-day work week is a further contrivance to hold together the flimsy fabric built on the premise of charging what the traffic will bear, as enforced by the exercise of the union's complete and absolute power.

Although some gains achieved by the miners were warranted, in the aggregate they are an excessively large portion of total mining costs. To maintain the high wage and other emoluments for miners, and a correspondingly high price of coal by cutting the work week, is unrealistic medication. It is aimed at relieving a result of the monopolistic disease rather than getting back to a basic matter, elimination of the infection.

Only the immunity from prosecution which the laws and courts have extended to the union makes possible its absolute monopoly over the miners, and the resultant ability to boost coal prices and to limit production. When full recognition of the inherent dangers of monopoly comes to the American people, it may be hoped they will act to make certain that no favored group will be allowed to wield that vicious power.



Wage hike versus fixed product price halted Alaska-Juneau operations in 1944

Gold Progress

Realization of Gold's Importance Spurs Action for Free Market

By JOSEPH STAGG LAWRENCE

Vice-President, Empire Trust Co.
and
Consultant, Gold Producers Committee,
American Mining Congress

AT luncheon the other day a friend asked, "What is the worst thing that could possibly happen to gold?" Unquestionably the worst thing that could possibly happen to gold would be its general demonetization. For ages gold has been the premier precious metal constituting a universally accepted medium of exchange and possessing inherent characteristics which made it appeal to the most deep seated acquisitive instincts of people under almost every conceivable circumstance.

Yet there is no blinking the fact that the principal demand for gold in recent centuries—a demand which has been an important contributor to the general esteem in which the metal has been held—has been its use as the currency base of the principal countries of the world. This monetary demand overshadows all others and should it disappear by accident or design it would constitute an unmitigated calamity for gold.

At the end of 1948 the yellow metal stood in great peril of precisely this fate. Not a single country in the world was on a fully convertible gold basis. To be sure, some 48 countries, members of the International Monetary Fund, maintained phantom equivalents in gold for their currency—equivalents so far removed from the common touch as to deprive them of any real significance. Actually, the use of gold in the alleged maintenance of parities by the International Monetary Fund is simply a patronizing concession on the part of the original authors and present managers of the Fund to what they conceive to be silly, ancient prejudices in favor of the metal.

A Silly Anachronism

The authors of the scheme to tie world currencies together by international bureaucratic fiat believe that gold is a silly anachronism—a left-

over from barbaric periods in which the glitter and durability of the metal made an appeal to primitive tastes. In the modern world, with streamlined currency tactics applied by skilled managements, it is as obsolete as an oxcart. If these architects of "a new and better world" in the field of money had dared, they would have repudiated gold finally and unequivocally in the Bretton Woods Agreement.

At the end of 1948 the great gold markets of the world, London and New York, were completely closed. Although the London market had made some tentative efforts in 1946 to promote trading in gold outside the areas in which it was directly prohibited, the Bank of England responded to the IMF whip and promptly flayed the errant bullion brokers of London back into line.

The market in New York today is dealing cautiously in natural gold. This apparently is possible because, as the Treasury admits with some annoyance, the attempt to force a complete compliance with the Gold Reserve Act of 1934 presents insuperable administrative difficulties. Therefore, in order to avoid the absurdities that have accompanied other forms of sumptuary legislation, the Treasury has deemed it expedient to tolerate the ownership, purchase, and sale of natural gold.

This, however, imposes a great burden upon the yellow metal. It is an awkward form in which to handle

gold. It is subject to the integrity of the container, the accuracy of the assay, and the caprice of a Treasury which is capable overnight of changing its mind. Furthermore, the production of natural gold hardly accounts for 5 percent of the total and the markets in which it is traded are extremely limited. Indeed, in the presence of all these disabilities it is surprising that any headway whatsoever has been made in such trading and more surprising still that the demand for gold is so keen as to bring for the yellow metal in this inconvenient form a substantial premium above the price at which the Treasury buys it.

Beyond this, the world today has some 18 to 20 quasi-free markets, all of them operating under difficulties, partly in the form of red-tape and regulations, partly in the form of difficult transportation. As a consequence, wide disparities emerge between these markets that should not be the case with a commodity as concentrated in value and as easy to handle and transport as gold.

Gold Reserve Act

The gold producer at the end of 1948 still operated under the drastic and wholly unreasonable prohibitions of the Gold Reserve Act. Here is a commodity of universal demand whose possession by the American citizen is

Gold has come to life as a national and international issue during the last six months. The dangerous decline in its prospects as a basic monetary metal has been reversed. Inertia, the vested interests of bureaucrats, alien socialist dogma, and domestic economic Calvinism are its chief foes.

specifically prohibited by statute. According to the implicit premises of this legislation, gold may safely be held only by the Government of the United States. Any widespread ownership of gold by the average citizen is likely, according to these premises, to jeopardize the national safety and undermine the allegedly solid foundation of our currency and credit.

Agency Arrogance

The executive agencies in their occasional references to gold all strongly deplore the opportunity for hoarding which a free gold market might promote. Apparently, the instinctive desire of most people to put away a part of their savings in the form of a substance whose real value is sure to survive depressions, deflation, and disaster is reprehensible, and state action to discourage that form of providence, which elsewhere in the world is highly esteemed, is

deemed correct. The instinctive foresight of the ant, the bee, and the squirrel is in the case of man, condemned.

This Act, likewise, imposes conditions upon the gold producer which apply to no others. He is the victim of a buyer who has complete monopoly power, who pays a price for gold fixed by himself and who is under no obligation to provide the gold producer with a fair return on the property used in production.

At the end of the year, the executive agencies found themselves so completely in control of the situation that it was not even necessary for them to state their position on the question of gold. The part that gold plays in our economy, in our currency and international trade is so complex and its ramifications so far reaching that the efforts of legislators to take action has in every instance so far been staved by the calamity chorus giving forth from the various agencies in Washington.

Power of IMF

This sinister conspiracy activated by Keynesian dogma and the vested interests of bureaucrats held in servile abeyance the natural objections which might have been expected ordinarily in the great gold producing areas of the world. The Union of South Africa produces 47.9 percent of the world's annual output of gold. That produc-



Recovery of natural gold accounts for less than five percent of production

tion is equal to 15 percent of the national income of the Union. It occupies a position comparable in importance to the combined weight of the steel and automobile industries in the United States.

It is of the utmost importance for such a sovereign commonwealth to have a free market in gold fully reflecting the various and deep-seated demands for gold. Yet when Nicholas Havenga, the finance minister of the Union, undertook the sale of 100,000 oz of gold to Mocatta and Goldsmid at a price of \$38.20 an oz, the International Monetary Fund pounced on this action as though it were a form of treason. The right of the Union to make such a deal was questioned and the veracity of its officials impugned.

Finally Camille Gutt, head of the IMF, actually flew to South Africa and read the riot act with variations to the South African Government. At the end of that period, in a release by Camille Gutt, it was made clear that South Africa had capitulated to the pressure of the IMF and undertook henceforth meekly to toe the line.

Canadian Obeisance

Similar obeisance comes from Canada. The National City Bank of New York acquired \$100,000,000 worth of British gold sovereigns from Peron. The purpose was to enable ARAMCO to make payment to Ibn Saud of Saudi Arabia for the vast oil concessions granted by that sovereign. He had wisely stipulated that the payment must be in the form of gold. Whatever notions the IMF and our treasury may entertain as to the gold equivalent of the American dollar, Ibn Saud in his covenant with the American oil companies stipulated that inasmuch as he was offering real black gold he would insist on a counterpayment in real yellow gold.

However, no such gold was available to private parties, i.e. American parties, and it became necessary for ARAMCO, with the approval and aid of American authorities, to make the deal with Peron. The gold was deposited in a Canadian Bank to the credit of the National City Bank of New York. Before accepting this deposit, the Canadian authorities insisted on clearing with Washington to see if the Sovereign Dominion of Canada might accept this deposit of basic currency without offense to the bureaucrats in Washington. No comparable abasement of a great power has occurred in recent years.

It is no exaggeration, therefore, to say that gold in the early days of 1949 stood in grave danger of the greatest calamity which could possibly happen to it, namely, demonetization.

Has anything occurred since the end of 1948 which changes the outlook and admits some ray of hope to this dismal prospect?

Stating the Case

In the first place, the case for gold in the postwar world has been articulated. The indefensible restrictions upon individual shippers of gold have been explained and to a degree exploited. The unfair position in which government gold policy leaves the gold miner has been set forth on a number of occasions, officially and otherwise, and has produced a better understanding of the gold miner's legitimate interests. The emphasis here in the exposition of the gold producers' position has been on the injury to the public interest resulting from an arbitrary, monopolistic price for gold.

The gold miner rightfully believes that gold is basic in a free economy, that a part of the great progress achieved by western communities is due to their enjoyment of a sound currency completely convertible into gold. One of the greatest, most persistent, and most malicious errors by the opposition is the constant reiteration that a return to gold can benefit only the gold producer. This is not only a palpable distortion of economic reasoning but, to the degree that it is utilized by the opposition, represents the deficiency in their brief and the intellectual poverty of its advocates.

Usurpation of Money Power

It has been pointed out, with some effect, that the abandonment of gold in 1933, the resort to a closed market, and the monopolistic absorption of all gold by the U. S. Treasury was designed originally as an emergency measure. The sole purpose at the time was to prevent speculators from profiting by the great increase in gold that occurred within the short span of a few months. It was never the intention of Congress nor, we believe,

of the President to leave this country permanently on an inconvertible paper standard.

The various Federal agencies which now profess to deplore the return of a free gold market looking to ultimate convertibility of the currency are simply trying to stretch a temporary expedient into a permanent device, assuring their own aggrandizement and the protection of their vested interest in a managed currency.

The position of the International Monetary Fund and the continuation of a bizarre and unrealistic structure of exchange rates have been explored. The arrogant presumption of IMF managers that 48 currencies, each of which has long since severed its direct contact with the realities of value, can be managed in an arbitrary ratio to each other by mere fiat has been described. The dangerous power exercised by this body of politically-irresponsible international bureaucrats in compelling sovereign nations to follow a course contrary to their own best interests stands forth more clearly today than it has at any time since Bretton Woods.

Senate Hearings

An important Committee of the Senate, i.e. Banking and Currency, on the 5th and 6th of May held hearings on

S-13 introduced by Senator Pat McCarran of Nevada and S-283 introduced by Senator Edwin C. Johnson of Colorado. The Senate considered this measure of sufficient importance to allot it time before the full Committee, which may be contrasted with the hearings on the extension of Regulation W and variable reserves, both of the utmost importance to bankers, which nevertheless were held before a sub-committee of the Banking and Currency Committee.

Senators Maybank, Bricker, Cain, Frear, Taylor, and Douglas gave cordial ear to the supporters of these measures. Senators Pat McCarran and Edwin C. Johnson, together with Congressman Engle, all appeared before the Committee and offered effective testimony in favor of a free market for gold which these measures provided. An impressive group of witnesses outside the mining industry itself offered testimony explaining the purpose and the probable effects of these measures. Among these witnesses were: James J. Mooney, president of Willys-Overland Motors; Dr. Willford I. King, chairman of the Committee for Constitutional Government; John J. Rowe, president of The Fifth-Third Union Trust Co. of Cincinnati; Thomas C. Boushall, president of The Bank of Virginia; and George



Mining of placer gold is at a minimum

M. Clark, president of the Pioneer Bank of Chattanooga. These witnesses had no axe to grind and by their appearance and testimony repudiated the specious contention of opponents that these measures merely contemplated special aid to gold producers. Only two members of the industry, Dr. Donald H. McLaughlin, president of Homestake Mining Co., and Fred Searls, Jr., president of Newmont Mining Corp., actually testified before the Committee.

Economists' National Committee on Monetary Policy

It is a sad and ironic commentary on the organization that the only witnesses presenting oral opposition to these measures were members of the Economists' National Committee on Monetary Policy. This Committee, organized in the early 30's after the Administration had cut the bonds of our currency to gold, has carried on a vigorous campaign for sound money. It has done a great deal of creditable work in calling attention to the monetary fallacies of the streamlined experts holding official positions in our government.

Yet here, on the very first occasion when a real opportunity presented itself for a practical first step on the road back to a sound currency, this organization issued a manifesto condemning the free market measures before the Senate Banking and Currency Committee and offered seven witnesses, all of them members of the Economists' National Committee, in opposition to the McCarran and Johnson bills.

The arguments in general invoke the specters of chaos and confusion, further devaluation, and a variety of monetary and economic calamities. The substance of their real argument is contained in two contentions. First, the country is now on a gold standard inasmuch as the Treasury is actually buying gold at \$35 an ounce and is maintaining the alleged value of the dollar in terms of gold in international markets. Their second argument is that the country has ample stocks of gold to return immediately to a domestic convertible basis at \$35 an ounce and that an intermediate testing period for an authentic dollar-gold value, which a free market would provide, is not only unnecessary but mischievous.

Assiduous Fantasy

The notion that this country is now on a gold standard is a fantasy. The statement that \$35 is equal in value to an ounce of gold is simply not true. The Treasury, to be sure, does pay \$35 an ounce for gold, but that is quite a different matter. This merely imposes a compulsory price of \$35 an

ounce for gold. In any equation the two sides must be equal to each other *both ways*. If a pound is equal to 16 oz, then 16 oz must likewise be equal to a pound. Otherwise the equation is meaningless. An ounce of gold offered to the Treasury is equal to \$35, but if any unwary citizen should go to the Treasury and demand an ounce of gold for \$35 he would immediately and unceremoniously be bounced out on his ear.

Regarding the maintenance of a dollar value in terms of $\frac{1}{35}$ th of an ounce of gold in foreign markets, this is belied in every free or quasi-free gold market in the world. In Toronto, for example, double eagles have a market maintained by one of the brokerage houses. A double eagle contains a little less than an ounce of gold. The gold content of that coin, therefore, has an American mint value of a little more than \$34. In Canada that \$34 in American money can be bought for approximately \$35 in Canadian money. However, to buy the same quantity of gold, i.e., \$34 worth which happens to be contained in the double eagle, costs approximately \$50 in Canadian money. Similarly, illustrations in other parts of the world corroborate the disparity between the value of the dollar and its purported equivalent in terms of gold.

Fort Knox Hoard

No one knows whether the gold at Fort Knox would adequately provide for all the demands for gold if the dollar became fully convertible. The opinion of the Economists' National Committee that this hoard is sufficient, is merely an opinion. There is ample evidence and considerable weighty opinion on the other side indicating that our monetary stocks would be quickly dissipated if every claimant could have the right to demand gold for each dollar at the rate of $\frac{1}{35}$ th of one ounce per dollar.

Since this gold is held in quasi trust for a possible return to an authentic gold standard, not only in this country but in other parts of the world, it should not be exposed to the gratuitous jeopardy suggested by the opponents of a free market in gold. Such a

market would hurt no one, cost the American taxpayer no money, and provide a reasonable period during which the value of gold in terms of the dollar could be approximately asayed. This information would then make possible a return to a fully convertible currency on a tenable basis.

In addition to the hearings before the Senate Committee on a free market and the wider publicity which the gold case has received, there are definite indications of rising resentment on the part of foreign countries against the arrogant and presumptuous attitude of American authorities on the question of gold. Camille Gutt may have obtained the capitulation of Havenga by going to South Africa and threatening him with financial excommunication if he failed to comply with the dictation of the IMF.

This may prove to be a Pyrrhic victory because it leaves in its wake a trail of resentment which will grow in volume. The same observation may be made about Canada and other gold producing areas in the world. Each one is forced to forfeit a natural interest in order to support a dogma and a structure of personal power which cannot justify itself in terms of effective currency performance or national or international interests.

Help the Tide

Finally, the world is revealing increasingly impressive evidence that the currencies of the world are overvalued in terms of the American dollar and that the American dollar in terms of gold is likewise overvalued. A reckoning will be difficult to postpone indefinitely. We believe that this false structure of artificial values rests on the sandy foundation of bureaucratic decisions and that it will collapse of its own weight within a period not exceeding two years.

Meanwhile, it behooves all those who believe in free enterprise and its necessary corollary, an honest currency, to press vigorously for a free market in gold as the necessary prelude to monetary integrity. It would be nothing short of tragic to permit this inherently sound cause to lose by default.

Automatic Hard-Facing

HARD-FACING came within the field of automatic welding with the development of continuous high alloy wires. Uniform deposits can be continuously welded at high speed with good efficiency since no alloy is lost in stub ends.

Automatic hard-facing wires are produced on special machines which form a continuous tube from mild steel strip; granular powdered alloy ingredients are added as the strip is being formed. Thus, a material of

high alloy content is obtained at the same time retaining sufficient flexibility for coiling and unreeling during automatic welding. Most hard-facing alloys for manual electrodes can be made for automatic application.

Worn, heavy equipment such as tractor rollers can be rebuilt by automatic equipment to full size at low cost and with an excellent service life. Crusher cones and brake drums may be hard-faced by automatic electric welding to greatly extend their service use.

Latest Developments in Belt Haulage

Installations Designed for Efficient Production

THERE have been a number of major developments in belt transportation in the past few years. Probably the most important is the increase in the speed of belt conveyors in coal mines. Since conveying capacity of a belt conveyor is increased as its speed increases, any increase in speed permits a reduction in width of the conveyor belt with the single limitation that this reduction is finally limited by the size of the lumps that can be carried.

As a graphic example, a belt conveyor 30 in. wide, running at 500 fpm, has practically the same capacity as a 42-in. belt at 300 fpm, if both are loaded with coal (size consist of coal being disregarded). The cost of the 42-in. conveyor would be approximately 40 percent greater than the 30-in. conveyor. By the same token, a 42-in. conveyor running at 500 fpm has virtually the same capacity as a 60-in. belt at 250 fpm, with a difference in cost again of approximately 40 percent.

The economy of speed to reduce capital expenditures is thus self-evident. The only argument against speed would, therefore, seem to be operating cost. It is considered that the difference in operating cost is negligible unless the smaller width conveyor causes excessive spillage.

At one mine the main entry 42-in. conveyors have been operating at speeds in excess of 500 fpm and at times are fully loaded. To date, more than 8,000,000 tons of coal have been transported with no major belt replacement and only negligible replacement of idlers.

There are, naturally, definite limitations as to the capacity of a given width of belt occasioned by the size consist of the coal. When very large lumps must be handled, the size of the conveyor must be determined by this one factor without regard to theoretical capacity. There is certainly room for careful study on long conveyor lines as to the feasibility of crushing the lump to 6 or 8 in. so that the belt conveyor chosen can operate at full capacity. Thus, a 24-in. conveyor operating at 500 fpm has the same capacity as a 36-in. conveyor operating at 200 fpm with approximately a 35 percent reduction in cost. Except for

quite soft coal, raw run of mine cannot be handled too satisfactorily on a 24-in. conveyor on account of spillage, but if the lump is crushed to 6 or 8 in., the crushed run of mine coal can be handled.

Among other interesting new developments are:

(1) The use of a short, inexpensive transfer belt to bring coal up to speed and to have the coal traveling in the same direction as an expensive slope belt, thereby markedly reducing wear and tear on it

(2) Use of belt conveyors to provide large storage capacity with minimum of expense

(3) Method of handling belt man trips with greater safety

(4) Use of true surge bins, which also provide storage, to reduce degradation, instead of conventional storage bins

(5) Improvements in belt conveyor controls from an operation standpoint

(6) Elimination of excessive water on belts caused by spray lines at transfer points

(7) Use of continuous angle irons along sides of conveyors to reduce spillage of lump coal

(8) Two unusual applications of belt conveyors

(9) Use of high tensile strength synthetic or steel cord belts for high lifts or long-center conveyors

(10) Varying distance between idlers on slope conveyors to keep the sag of the belt the same at all points along the conveyor

Transfer Belt Conveyor

When mine car haulage is used underground and coal is brought to the surface by belt conveyor, often the discharge from the underground coal bin is at an angle to the slope conveyor. Where belt conveyors are used underground, frequently the discharge of one is not directly in line with the other. Then, unless quite expensive chute work and often a large excavation is employed, the coal and rock strike the belt at an angle to the direction of flow and at much less speed than the conveyor is running. This causes bruising, abrasion, and spillage.

The use of a short belt conveyor,



By CAREL ROBINSON

Robinson & Robinson

inexpensively constructed, to receive the coal from the bin or another conveyor, permits turning the coal in the proper direction and brings it up to proper speed when it is received by the main slope conveyor or other conveyor. Last September, an installation of this sort was made at Rail and River Coal Co., Bellaire, Ohio. (See Fig 1) Since then, approximately a million tons of coal and rock have been brought to the surface. In May of this year, it was stated that this main slope belt looks like it did when new; that in the eight months of operation, it has suffered three small cuts which had been vulcanized and beyond this there was no visible wear. Attention was called to the fact that the cushion belt, which was badly damaged and which cost approximately \$800, had almost completely protected the slope belt which cost more than \$18,000.

The Perry Coal Co. and its antecedents have been operating a shaft mine near St. Louis for 50 years. Typical of such installations, the cages were small, limiting the size of the mine cars and making delivery of supplies and machinery into the mine difficult and expensive. The management had already taken a major step forward in the use of large mine cars in the face areas. The coal was transferred at an underground tippie into the small cars and was then hauled to the shaft bottom. This system, a marked advantage over using small cars, still had serious drawbacks. A new mine would, of course, have solved the problem. The mine caters largely to truck trade and the preparation plant is strategically located. This made it almost a requisite that the site of the preparation plant be left unchanged.

The management decided that the answer to these related problems could best be solved by sinking a 664-ft slope, located so that the coal could

be brought from underground directly into the present tippie. At the foot of the slope a 200-ton bin is being constructed. Eight-ton, drop-bottom mine cars will be placed in service when this construction is completed, replacing the antiquated two-ton cars. Coincident with this broad, rather unique plan several other innovations were evolved for this mine.

Large Storage Capacity at Minimum Cost

It was desired by the Perry officials to have a large storage bin at minimum expense. The raw coal from the mine will be transported into the tippie by belt conveyor. It will be crushed and will enter a small bin equipped with a feeder. Whenever the feeder is stopped, the coal will overflow on a belt conveyor, which will carry it out of the tippie parallel to but in the opposite direction of the main slope conveyor. The discharge end of this conveyor will be located near the portal. It will discharge on a stacker belt which will be driven by the return belt. The discharge end of this conveyor is located over a small hopper which goes from the surface down into the slope. A feeder at the bottom of the bin is located directly over the main slope conveyor.

When coal is flowing on this conveyor, it, at first, will discharge directly into the hopper. When the hopper is filled, the stacker will rise automatically, by means of a control similar to a Bindicator, and spill coal out on the ground. (See Fig. 2) As

the pile grows higher, the stacker will rise 6 in. at a time until the pile is 44 ft high. At this time there will be a pile of coal roughly in the shape of a cone. The base of the cone will be 108 ft in diameter. The center of the cone of coal will feed by gravity into the bin and thence, by feeder, onto the slope conveyor where it will go back into the preparation plant.

There will be approximately 1750 tons of live storage which will feed by gravity into the hopper. On the outer edge of the cone there will be 1250 tons of coal which can be pushed into the hopper by a bulldozer whenever it is desired. Thus, a total storage of 3000 tons of coal will be provided at minimum expense.

Belt Conveyor Man-Trips

It was decided that too much time would be lost if the miners had to be transported down the slope in mine cars. The use of the belt conveyor for the man trips was logical, but as this was to be a high-speed belt and miners must be ridden slowly, two speeds had to be provided. Delivery of a two-speed motor was 30 months and the slope would be ready in six months. The use of a slow-speed motor, which would be engaged and disengaged by a clutch, was considered but was discarded for various reasons. The final solution was to place a low-speed motor in line with the high-speed motor and direct couple the two. Thus, whenever the high-speed motor was being operated, the low-speed motor was turning at more than double normal speed but without harm to it.

To facilitate men in getting on and off the belt conveyor in this slope, flat platforms are provided at the loading and unloading stations. These are level with the top strand of the conveyor. Flat idlers are also used. The idlers will normally lie on the deck plate of the conveyor. When a man trip is being operated, the troughing idlers will be turned down and the flat idlers will be raised. Thus, at the points where men get on and off the belt, the belt line will be flat and level with the platform.

For a two-fold purpose, it is planned to provide subway turnstiles at the loading stations. The men will operate the turnstiles by putting in their brass checks. This will force them to go through the turnstile in an orderly manner and prevent undue crowding on the conveyor. Each man will be issued two checks with his number on them when the lamps are issued. They will put one in the turnstile at the portal entrance. This will provide a positive check on the men in the mine. They will carry the other check with them and, at the end of the shift, will put it in the lower turnstile. This will effectively check them out of the mine.

To prevent the men from riding too far past the unloading station, an electric eye is placed immediately beyond the station which will stop the conveyor in the event a man does ride beyond it. A control wire will be strung above the conveyor so that the belt can be stopped from any point along its length. The controls will be sectionalized into 300-ft sections and will be so arranged that after the conveyor is stopped it cannot be started until a push button, located at the end of each of the 300-ft sections, is pushed.

A short, protected surface passageway will be provided for men walking between the wash house and the loading-unloading station. Thus, in winter, men wet with sweat from work in the mine will not be exposed to weather until they emerge in dry clothes from the wash house.

In effect, the benefits of a brand-new coal mine will be obtained without losing the strategic benefit of the present location. Thus, by the wizardry of a modern belt conveyor, a 50-year-old mine has been reborn and in its new form will emerge as one of America's most modern mines.

A True Surge Bin

In a coal mine, the delivery feed to the preparation plant is in an uneven flow. At a large number of mines a storage bin is installed, either underground or on the surface, to provide a uniform flow to the tippie and to keep the mine operating when the tippie is shut down. All of the coal passes through this bin. The system

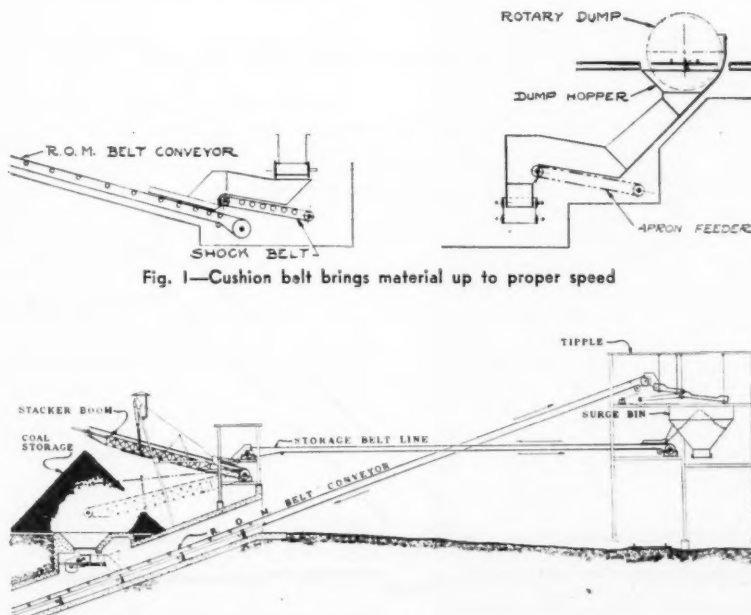


Fig. 1—Cushion belt brings material up to proper speed

Fig. 2—Unique belt arrangement provides ample storage

works satisfactorily except that degradation is excessive. To reduce this degradation as much as possible, one mine has installed a bin which is used only when required to even the flow to the tipples.

The raw coal is delivered to the preparation plant where it is crushed to 8 in. It then goes into a five-ton bin whose feeder is set at the desired rate of feed to the wash boxes. Whenever more coal than this is delivered to the bin, the bin overflows and the coal falls on a 36-in. belt conveyor, which conveys the coal back to a 300-ton surge bin located over the slope. This feeder in this bin feeds this coal on the main slope conveyor. (See Fig. 3.)

This feeder operates only when there is less than the desired amount of coal on the slope conveyor. The feeder, which has a number of variable speeds, is controlled by a spring roller arm located under the top strand of the belt. The roller arm is depressed from zero to full depression, depending upon the amount of coal on the portion of the belt passing over the arm. The speed of the feeder is changed automatically as the arm rises and lowers.

Belt Conveyor Controls

In a mine where belt conveyors are used for transportation and where shuttle cars discharge directly on the conveyor, rather elaborate controls are necessary to insure against excessive spillage and to eliminate, insofar as possible, any shuttle car delays. As a concrete example, at one mine it has been found that a 42-in. belt conveyor running at 550 fpm can transport coal at the rate of 1200 tons per hour without serious spillage. Room entry belt conveyors are 36 in. wide. Shuttle cars discharge directly on them, unloading at the rate of 10 tons per minute, or at the rate of 600 tons per hour. Any two room entry conveyors can discharge their loads on the same section of the mother conveyor but no more than two, or serious spillage and damage will result.

A control system had to be devised to eliminate this hazard. This system consists of a series of spring roller arms mounted under the top strand of the belting. These arms are placed under the 42-in. belt, 20 ft inby the discharge point of each 36-in. room entry conveyor. Another one is placed under each 36-in. conveyor near its discharge point. Whenever the 42-in. conveyor is fully loaded, the arm under this conveyor is fully depressed; if at the same time the arm of the room entry conveyor closest to this arm is depressed, this conveyor is stopped. If, however, the 42-in. conveyor is only one-half loaded, this arm is only partially depressed and the 36-in. conveyor continues to run. If only a half

load is on the 42-in. conveyor and a full load is on the 36-in. belt, it will continue to run; or if the 42 in. is fully loaded but no coal is discharging on the 36 in., it will still continue to run. It has been the experience at this mine that quite often the mother belt is fully loaded when a shuttle car discharges onto a panel belt. The panel belt does not stop as the load from the shuttle car has not yet reached the discharge point. Using this system, delays from shuttle cars waiting because of the mother belt being fully loaded are insignificant.

Water Spray Control

As is required by law in most states and as good mining practice in any state, water sprays should be used at every transfer point on a belt conveyor system to allay coal dust. Since the flow of coal is intermittent on a conveyor system there are times when there is no coal or only a small amount of coal on the conveyor. During these periods the belting itself receives a thorough drenching. This makes fine

particles of coal cling to the belt on its next time round. These particles, as they are dislodged from the belt on the return strand, build up around the return idlers, causing them to "freeze" unless careful and somewhat expensive care is taken to remove them.

One mine has worked out an excellent solution to this problem as follows: Just inby the discharge point of each conveyor a spring roller arm, under the top strand of the belt, is installed. As soon as it is depressed, it actuates a solenoid valve which turns on the water sprays. As soon as the switch rises, the valve automatically cuts the water off.

Angle Iron Installation

One mine has recently installed angle irons on 5000 ft of mother conveyor. These are placed 6 in. outside the idlers and 8 in. higher than the highest point of the side idler. This has worked, to date, 100 percent satisfactorily, in virtually eliminating spillage. Big lumps, as they ride along on a high-speed belt, do some bounce

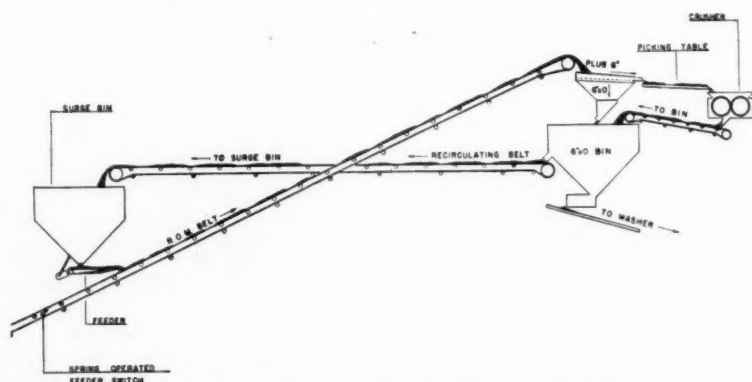


Fig. 3—True surge bin reduces degradation of tipples feed

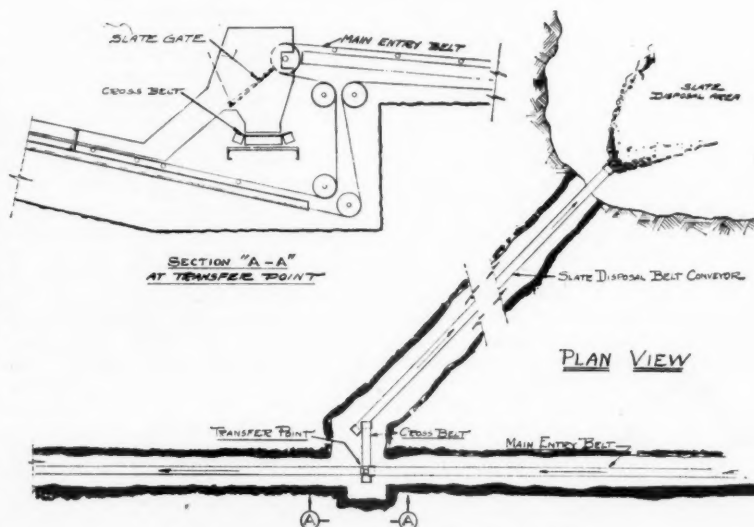


Fig. 4—Gate arrangement simplifies refuse disposal

ing; as a consequence, a fairly good number will bounce off the belt and the angle irons prevent this.

An objection, of course, can be raised that small lumps can fall off the belt and get wedged against the support for the angle iron. The management was aware of this and has been continuously checking to determine if any damage was being done to the belt because of this. To date, no evidence of this has been discovered.

Another objection which was raised against the angle irons was that if the belt were not properly trained, it would weave and would wear against the side of the angle support. My only answer to this is that there is no excuse for not keeping belts trained properly, and this point cannot be emphasized too strongly.

Refuse Disposal

At an all-belt drift mine, it is necessary to handle a large amount of mine refuse on the conveyor system. There is only limited room on the hillside where the coal goes to the tippie. This was being rapidly filled and the situation was critical.

Fortunately, on a hillside at the back of the mine, there is ample room for refuse disposal. A unique system was then devised whereby whenever refuse from either of the two main working areas is being conveyed on the coal conveyor system, an attendant throws one of the two gates and the refuse is then discharged on a short feeder belt which, in turn, discharges on a refuse belt. This conveys the rock to the side of the mountain away from the tippie and discharges the refuse down the hillside. (See Fig. 4.)

Transporting Coal to Two Tipples

A rather interesting installation is currently being made. A coal company has a tippie located on a river, and through a mountain has another tippie located on its own railroad and three miles from the river. At times it is desirable to load directly on the river and at other times, to load on the railroad.

The new mine, an all-belt one, will normally load its coal on the railroad by means of a slope belt conveyor. When it is desired to load by river, a belt tripper on the mother underground conveyor will be used to discharge the coal into mine cars, which will transport the coal to the river.

Cord Belts

In recent years, rubber companies have developed marked improvements in belt construction. Reference is made to use of nylon and rayon for flexibility and cords, including steel, for strength. They are helpful for

the increased length of belt made possible for each drive unit. The objection to this improved cord construction is the increased cost per foot.

Frequently, it is found that long conveyors cannot be justified economically. For example, if it was desired to use a belt conveyor system for 500 tons of coal per hour a distance of 7500 ft, three 2500-ft, 36-in. belts, running at a speed of 500 fpm, can do this. Using standard underground conveyor units, the initial capital cost would be approximately \$210,000. For a single conveyor, using cord construction, the estimated cost would be approximately \$375,000. Two objections to the less expensive construction are degradation and life of the belt.

Degradation is negligible on a three-unit system with well-designed chutes. There is the well-known H. C. Frick series of belt conveyors where a carton of eggs can safely be transported a distance of eight miles. Almost certainly any coal degraded in transit would be degraded in the tippie.

There remains, then, the life of the belting. Here the only differences are the flexing life and the two transfer points. Rubber manufacturers have built such flex life into modern belting that it is much greater than the life of the belt. With pneumatic idlers and precisely designed chutes, the wear

at the transfer point is at an absolute minimum.

It is, therefore, considered difficult to justify very long conveyors economically under normal circumstances; where high lifts in slopes are required, then the use of a single conveyor is highly desirable. There are, of course, other special applications where their use can be justified.

Roller Centers

When discussing new developments in belt transportation, reference should be made to the controversial issue related to idler centers on slope conveyors. At the drive end of a belt, the tension is greatest and, therefore, there is the least sag of belt between the rollers. The minimum tension is at the tail end. As a consequence, there is comparatively little tension at the tail end.

One school of thought is to provide a uniform degree of sag throughout the length of the belt conveyor. This can be accomplished by having the rollers at closer centers at the tail end and further apart near the drive. This uniform, predetermined amount of sag between the idlers is, of course, desirable. The design and construction cost, however, is much greater than for uniform sections with uniform distance between rollers.



Chain conveyor serves as a surge bin to control belt loading

B&O Spur Opens Coal Reserves

A NEW coal mine at Overfield, W. Va., operated by the Compass Coal Co., a subsidiary of the Clinchfield Coal Co., went into production in February 1949. The mine will have an estimated annual production of 1,000,000 tons, and is expected to carry on profitable operations for 25 years or more.

The coal is from the Pittsburgh seam, useful for coking and general steam purposes. Most of it will be used in manufacturing and utility plants in the northeastern United States and in Canada. Some may be exported to Holland.

In order to serve the mine, the Baltimore and Ohio Railroad has constructed a nine-mile spur into the area. This spur opens a virgin field of high quality coals in the Valley of Elk Creek, in Barbour and Harrison Counties. This coal field has an estimated 100,000,000 tons of recoverable coal in the Pittsburgh and Redstone seams. Both seams are of favorable thickness and excellent quality, outcropping above stream level and thus desirably situated for economical mining.

Construction of the new spur of the B & O serving this mine was begun in September 1947, and completed in January 1949. This single-track spur extends westward from the end of the Berryburg Branch of the B & O, from Berryburg to the vicinity of Overfield. Its length is 8.9 miles. Immediately outside of Berryburg the new spur passes through a long tunnel, and then follows the depressions formed by Stewart Run and Elk Creek.

Exclusive of the tunnel, the construction of the spur required 800,000 cu yd of grading and the construction of two bridges over Elk Creek. The cost of the spur and the tunnel totaled \$3,365,000. The grading, drainage and other structural work on the spur was contracted by the Sutton Co. of Radford, Va., and the Empire Construction Co. of Baltimore, Md. The track was laid by A. S. Wikstrom, Inc., of Skaneateles, N. Y.

Passing through a 1700 ft divide between the watersheds of the Tygart River and the Elk Creek, is the Lough tunnel. It is 1525 ft long, the largest built on the B & O in many years. To construct the tunnel, some 40,000 cu yd of material was mined. The job was made doubly difficult because the mountain was once the location of a Consolidated Coal Co. mine and the tunnel passed through mine workings that had been abandoned 50 years ago. The excavation for the

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tunnel approach cuts involved the movement of about 150,000 cu yd of earth. The height of the tunnel is 24 ft from the top of the tracks, including 15 ft to the spring line, and 9 ft from the spring line to the apex.

Tunnel advance averaged 12 ft in a 20-hour workday (two 10-hour shifts). Steel liners were installed as quickly as possible after excavation. Altogether some 2,500,000 lb of steel liner were used. Once in place, the steel liner was faced with a 20 in. thickness of concrete, poured between the liner and the concrete forms

erected inside of it. Altogether 13,000 cu yd of concrete were required.

In addition, 3500 linear ft of concrete gutter were built to drain sulphur-laden water coming from the old mine working, and there are also 2000 ft of other drains.

Work on the tunnel started in December 1947, and was completed in January 1949. Tunnel driving was begun from the west end. The tunnel construction job required an average of two men outside to support the activity of each man on the inside. Contractors for the tunnel



Clinchfield Coal Co.'s tippie nears completion



East portal of Lough tunnel

were the Bates and Rogers Construction Corp. of Chicago.

Two other new coal mines are being opened on the lines of the B & O in northern West Virginia. One is the mine of the Weirton Steel Co. near Morgantown on the Monongahela River. This mine has an estimated annual production of 1,000,000 tons and will provide coking coal for Weirton plants at Wheeling, Buffalo, and Detroit. The other new mine is owned by the Sharon Steel Corp. and is located near Fairmont, W. Va., on the old main line of the B & O. It has an estimated yearly production of 500,000 tons and will serve the Sharon Steel plant at Fairmont.



Jib jumbo in combination with long feed reduces lost time

How to Get the Most Out of Jumbo-Shovel Installations

By RAY W. JENKINS

Special Representative
Joy Manufacturing Co.

MECHANIZATION of heading driving, as spearheaded by the application of shovel loaders and followed by development of the jumbo and improved haulage equipment, has reached almost universal acceptance. This acceptance is based on achievement of a higher rate of advance and greater productivity per man shift, with improved costs during a period of increasing labor demands. In applying this mechanized equipment, management has found that there has been almost a complete change in the nature of its daily problems. Today's operator must concentrate his equipment and production effort in order to maintain a high output for each unit of equipment, rather than have his tonnage or advance scattered in many slower moving headings. He must plan and coordinate to a far greater degree and make a greater effort to convey his desires to the men at the face by training supervisors and miners. His man-

To attain the greatest possible efficiency from jumbos and shovel loaders in driving headings requires a careful scheduling of the component operations. Maximum advance at minimum cost is the objective. This paper by a specialist in the field analyzes the problem and shows how best results may be obtained.

power requirements have changed from physical stamina as a prime requisite to mechanical ability, a high degree of coordination, and an ability to work as part of a team. Operators have been able to take these new problems in their stride and are now in an excellent position to utilize new equipment as it is being developed.

A field survey of installations indicates that actual improvements in rate advance, increased productivity, and lower labor costs per foot have justified expectations in making the increased investment. Certain applications have been outstanding in achieving from 25-50 percent above the usual average. A minority of installations

have not shown improvement and the equipment has been used primarily as a labor-saving device with no effort being made to increase productivity. Under certain extreme physical conditions, this may be justified, but for the majority of installations, the increased investment must be followed by a like increase in productivity. This article concerns the practices followed by operators on the more outstanding installations of the shovel loader—jumbo combination.

Characteristic of the outstanding installations of the shovel loader-jumbo unit in hard rock headings, is the attention which management has given to the mechanical details of installa-

tion, maintenance, and services; to personal details of training supervisors and miners; and to incentive for increased output. The immediate solution of these problems has brought about an increased application of the production engineering techniques of planning, organization, training, and organized service.

Cycling Operations

Planning of the work starts with determination of the size and shape of the heading or headings and setting up a schedule for its advance. In some instances, as with ventilation or drainage tunnels, the shape and size are fixed by requirements. Generally, though, a consideration of the equipment available exercises some control over the size and shape. Ordinarily, single-track headings are limited to a minimum size of 5 by 7½ ft which is the minimum safe working space for the smallest size shovel loader. If the heading must be supported, clearance has to be provided under timber. For large shovel loaders, the minimum safe working height is 8½ ft. Widths which can be mucked depend on the track system used and the cleanup width of the size shovel loader used. In most cases, where practical, triple rail or a double track system is recommended for widths greater than 10 ft to eliminate hand cleanup of the ribs. Double track in wider headings also improves car service to the loader.

After size and shape and rate of advance have been determined, the next step in planning is to set up the cycle of operations to attain this planned rate of advance with the greatest efficiency. Determination of the cycle depends on several factors: are single or multiple headings available; how long will ground stand without support; will the ventilation system make blasting possible as soon as drilling has been completed or delay it until the end of each shift.

After these factors have been determined, the cycle can be planned. From a basic standpoint, advancing a heading is accomplished by repeating a certain progression of operations; breaking, loading, installing support if necessary, and transporting the broken material from and service materials to the face. The rate of advance is determined by the depth and frequency of the actual blasting. It may be said that the only productive operation in a face is the actual blast. Until the selected material is excavated or broken from the solid, nothing else can be done. The way to lowered costs and greater efficiency in this repetitive cycle is by intensified mining; that is, making the face available for blasting with the greatest frequency by doing everything possible to expedite all face operations.

In planning an efficient cycle, it is interesting to note how many time factors are almost independent of the depth of round. This particularly applies to "unproductive" time, i.e., operations other than actual drilling, loading holes, or shoveling. For example, take the hypothetical situation covered in Table I and its graph with an assumed unproductive time of one and a half hours per round. This is 37 percent of the total cycle time for a 3-ft round, 18 percent for a 9-ft round, and 12 percent for 15-ft rounds. This is important as far as utilization of manpower is concerned.

In the same respect it is interesting to note that in the case of drilling with long feeds, the time does not increase proportionately to the increased depth of round. The time to spot holes or change steel is nearly constant while drilling time increases with the depth of hole. Laying out the cycle consists of organizing the work in such a manner that the equipment is actually performing its function in the greatest possible percentage of the over-all time.

By careful planning and training of crews, it has been possible to keep drills actually drilling 75 percent of the over-all drilling time and loaders 40 percent of the over-all loading time.

Assuming, then, that the amount of unproductive time involved in operations other than drilling and mucking is constant, the factors upon which the efficiency of the cycle of operations depends are the drilling and mucking themselves. Total shift time less unproductive time leaves the total time allotted for drilling and mucking, the time which must be divided between the two in the best ratio for greatest efficiency.

Deep Rounds Boost Progress

To be considered in the drilling phase of the cycle are the depth of round to be pulled and the best type round for the proper results in the rock to be blasted. Of definite advantage is the deep round since it greatly reduces the percentage of unproductive time in relation to the entire cycle as shown in Table I. Even in bad ground it is often possible to pull a deep round if the cycle time is short enough. Timber can be boomed from the muck pile and will support the roof until mucking is completed and permanent timber can be set. Factors to be included in determining the depth of round are the method of blasting and the ability of bits to penetrate to greater depths economically. The development of improved small gauge carbon steel bits which require only ¼-in. changes and the increased application of tungsten-carbide bits have practically eliminated the problem of bit penetration. The problem of blasting deep rounds has received serious consideration and has progressed to the point where from 75-90 percent of ground conditions, ranging from coal measures, limestones, and other sedimentaries to altered and fresh granites and metamorphic rocks can be blasted to depths of 10 ft in ordinary sized mine headings. This has been accomplished with a saving in drilling and powder cost.

The development of deep rounds is primarily one of breaking deep cuts which must be drilled nearly parallel to the direction of advance because of the physical impossibility of handling long steels at sharp angles to the face as required by draw cuts, V cuts, or pyramid cuts. These requirements

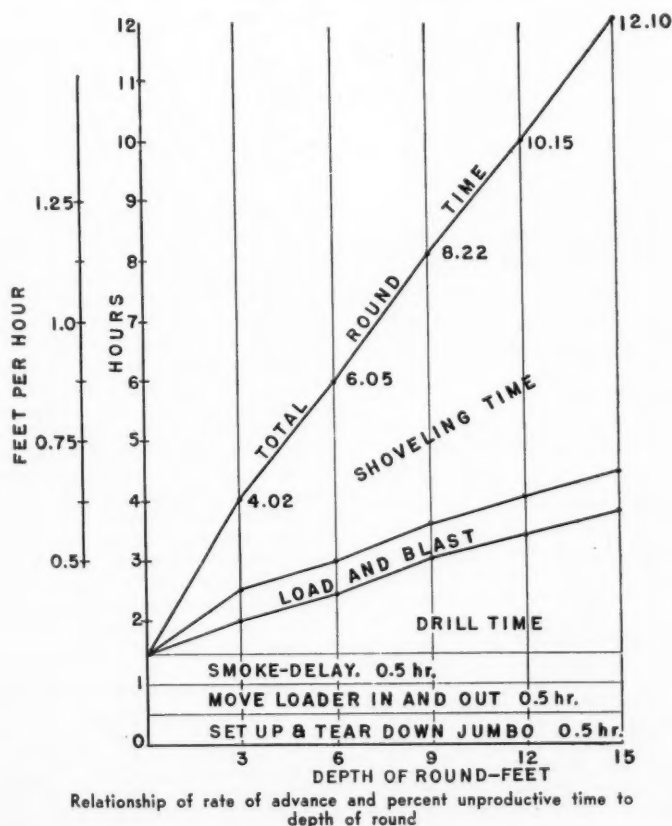
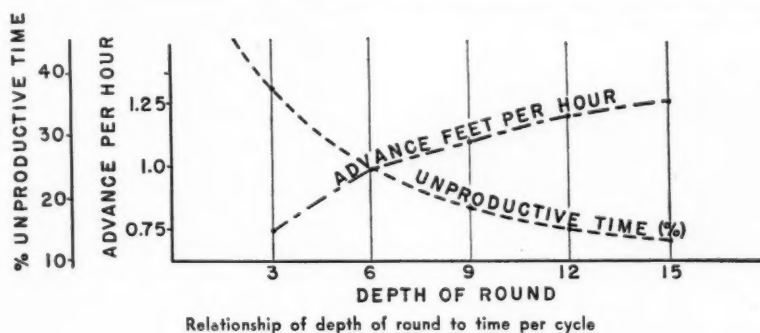


Fast muck removal is essential to getting maximum jumbo use

TABLE I
RELATIONSHIP OF DEPTH OF ROUND, UNPRODUCTIVE TIME, AND RATE OF ADVANCE FOR GENERAL CONDITIONS USING JOY JIB-JUMBO & HL-3 LOADERS

Depth of round	Cubic feet per round	10-cu ft cars (1 ton)	Jumbo set up and tear down	Drill time-hr	Load and blast-hr	Smoke delay-hr	Move loader in and out	Shovel time	Total cycle time	Unproductive time	Percent unproductive time	Ft/hr advance
3.....	300	30	0.5	0.52	0.5	0.5	0.5	1.5	4.02	1.5	31%	0.75
6.....	600	60	0.5	1.00	0.55	0.5	0.5	3.0	6.05	1.5	25%	1.00
9.....	900	90	0.5	1.62	0.60	0.5	0.5	4.5	8.22	1.5	18%	1.10
12.....	1200	120	0.5	2.00	0.65	0.5	0.5	6.0	10.15	1.5	15%	1.20
15.....	1500	150	0.5	2.40	0.70	0.5	0.5	7.5	12.10	1.5	12%	1.25

Based on 10 by 10-ft heading—30-hole round.
Drill speed 18 in. per min—2 or 3 man crew.
Loading time 1 min, car change 2 min.



have been met by the independent developments in many mining districts of shatter cuts, slot-burn cuts, clover-leaf cuts, flat pyramid cuts and other types of deep cuts. The general principle involved with these cuts is breaking to a drill hole, sometimes reamed, with the other cut holes to produce an opening 6-12 in. in diameter to the expected depth of the round. This type of round is particularly adapted to the jumbo type drill mounting because of the ease of accurately spotting the holes. These rounds are being adopted to a wide variety of conditions. It should be anticipated that some experimentation on hole spacing, loading, and timing will be required to obtain the best efficiency and best pattern under local conditions.

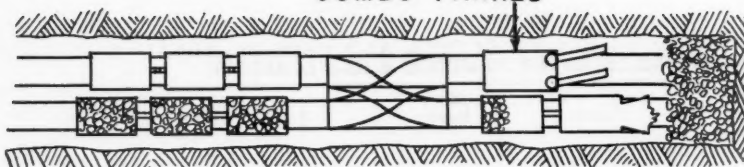
In planning, it is also necessary that consideration be given to the relieving and peripheral holes. The use of predetermined markings on jumbos and base are of considerable assistance in the case of unskilled miners. Generally the installation of jumbos has effectively coped with excess overbreak and support caused by the shattering effect of misaligned holes.

Selecting Haulage Equipment

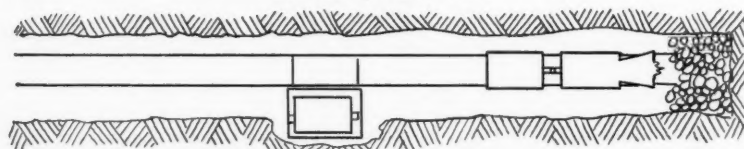
Planning, as applied to the loading phase of the cycle, is principally a matter of selecting the proper size loader and providing the proper means of changing cars and trams and advancing the track. Entering into this matter are car size, car type, the number of cars available, number of locomotives available, length of haul, grades on the haulage way, and car dumping, cleaning and coupling facilities. These factors, when determined, allow an estimate of the amount of time required for the loading cycle.

Changing cars can be accomplished by any of several different methods. Single-track, narrow headings use either temporary or permanent side switches, vertical or horizontal cherry-pickers, car passing carriages, or California switches. Wider headings generally employ double track at the face ahead of the California switch to

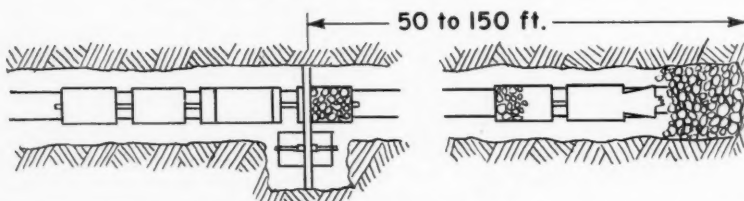
JUMBO PARKED



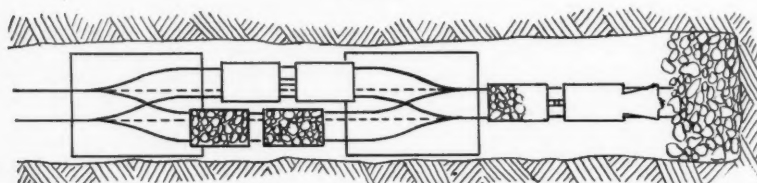
Double track with portable cross-over switch. Empties are moved ahead and loads back with portable hoists



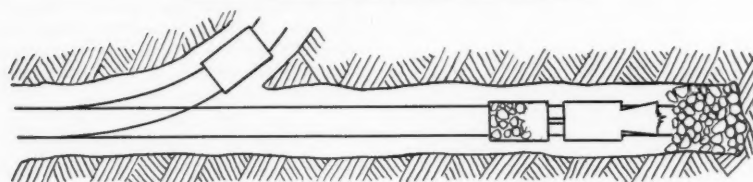
Single track with car-passing carriage or jump sheet for small cars. Jumbo is parked in second passing station. Train is shuttled with locomotive.



Cherry-picker method similar to car-passing carriage. Overhead or side-acting models may be used



California switch method. Switch is moved ahead on the permanent track with the loader. Trains are shuttled with the locomotive



Using double heading to switch cars

reach all broken rock, while empties may be passed on the unused track. This same method also applies to wide, double-track headings.

On single-track systems, it is necessary to move the empties and loads by means of a mine locomotive, and it is generally necessary to have it available during the loading cycle. Since it is usually desirable to keep the passing point within 100 ft of the face it will, in most cases, take two or more trains of cars to handle the broken rock. Proper planning will reduce train changing time to a minimum and this time can be utilized at the face for barring down, advancing stringers, or laying ties.

Track and Timber

Methods of track advance most commonly employed are the use of slide rails, channels, or short sections of portable track. Sections of portable track made the length of the distance from the center of the front axle to the lip of the bucket when in the lowered position have been found to be highly satisfactory. In this length they can be laid into the area dug below track grade to eliminate completely any hand digging. If short, slotted fishplates are provided on each side they may be quickly coupled and warped around curves. Where it is necessary to carry a permanent ditch

or exceptionally heavy track, it has been found desirable to lay those portable sections on the subgrade and to elevate to the final grade behind the face far enough back to avoid flyrock.

Where timbering is necessary, a much used method provides a means of placing the caps on stringers from the muck pile with suitable lagging for protection. The posts are placed after mucking and the jumbo may be used as a staging for blocking the timber. Timbering should be securely braced and usually only lagged enough for immediate protection. The remainder of the lagging is placed after the face has been advanced far enough that the concussion will not disturb it.

After the equipment and method for car and train changing has been selected, it will be possible to estimate the loading time per car and, subsequently, loading time for the complete cycle. This also establishes the amount of time remaining for drilling and enables the determination of the number of drill units to be used.

This is done by first determining or estimating the drilling speed in the ground with the size drill and bit to be used. It has been found that a jib jumbo with short feeds up to 48 in. can maintain an over-all drilling speed of 50-60 percent of this figure, the machine being idle for changing steel and moving between holes the remainder of the time. For long feeds, the efficiency figure is 75 percent. Thus, by having the total footage per round as determined by the planned method and dividing by the over-all drilling speed, it is possible to determine the drilling time for one unit. This is adjusted by adding units to complete the drilling in the allotted time. Generally speaking, the standard two-machine jumbo is satisfactory for ordinary size headings. However, where time available for drilling is limited by other conditions or where exceptionally hard, slow drilling rock is encountered, it may be necessary to add units to maintain the cycle.

Another factor in efficient drilling is the size and shape of the face. Ordinarily, a side-by-side arrangement is satisfactory for headings up to 10 or 11 ft in height and 12 ft in width. For greater width, the bases must be spread further apart and a raised deck for one or more machines for greater heights. In planning the layout of the jumbo, the angle between drill and the jib of boom should be kept under 30 deg unless additional provision such as swing cylinders or locking plates are provided.

Organize for Fullest Equipment Use

The organization of the work depends, primarily, on whether there are single or multiple headings available and whether ventilation will permit

blasting during the shift. Mine operators should make every effort to attempt to lay out their work so that equipment can be used in multiple headings. This permits the drilling and loading crews to follow their equipment from face to face and increases their skill because of specialization. It also reduces the time that capital is tied up in equipment by utilizing the expected life in feet of drilling or tons loaded in the shortest amount of time. It enables the operator to avoid technological obsolescence caused by development of improved equipment before full life is extracted from his present equipment. In cases where comparisons have been made between efficiency in single and multiple headings, it has been found that from 25-33 percent greater output per man shift has been obtained. Usually it is found necessary to have one more heading available than can be loaded out in a shift in order that the drilling crews may start immediately upon coming on shift. This can be cut down if blasting during shift is permitted.

When only single headings are available, it is usually desirable to lay out the work so that a complete cycle of operations can be made each shift, even though it is feasible to blast during shift. This can usually be done by regulating the depth of round, providing proper service, or taking some items out of the face cycle; for example, by laying temporary track at the face and permanent track by another crew while drilling. For this type of cycle, it is desirable to arrange the operations so that the blasting is done at the end of the shift to avoid smoke delays during the shift. Loading is then the first operation. Heading crews usually consist of two men although three may be provided when they must obtain their own timber or supplies or advance pipes and vent lines. The crew should be as small as possible to eliminate confusion at the face.

Another factor to be considered in the organization of the work is the inclusion of men in the crew for training purposes. This is not necessary or desirable where there is a plentiful supply of trained drift miners, but in foreign countries or in new mining areas it is sometimes necessary for men to work as helpers for a considerable period of time before they can safely and efficiently run equipment. Drilling in particular should always be planned on the basis of one man to a drill.

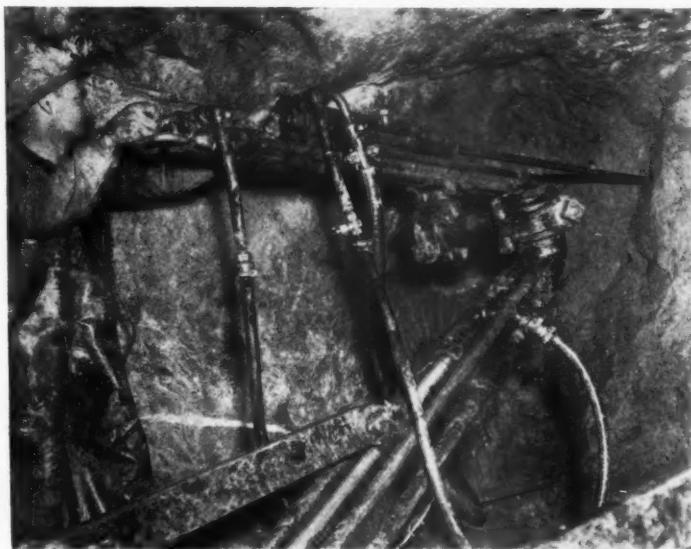
In organization the question of supervision should be included. Mechanical equipment, which moves at a greater speed than previous hand methods, requires more intensive supervision. The supervisor must be particularly trained in coordinating the various operations and organizing

his haulage, maintenance and service crews for the greatest efficiency of the loading and drilling equipment.

Training Increases Efficiency

The fourth essential of efficient mechanized mining is training. After management has determined a cycle of operations, established the methods to be used, and provided for service, it is then necessary that its wishes be conveyed to the supervisors and the miners. This phase of operating has been the most neglected and yet is one of the most important.

Experienced miners must be shown new methods and new men must be trained to replenish the labor supply. The training program, properly handled, is an excellent means of improving morale and building a sense of teamwork that is so essential to mechanized mining.



Drilling back holes with boom jumbo

Constant improvement in methods and equipment is a means of stimulating otherwise dull and disagreeable jobs. Such incentive is far more important than any advantage to be gained by long and vigorous periods of standardization which build up inertia in an organization. Sometimes the introduction of new equipment and methods is the only means that management has to disrupt "featherbedding" and "low task" jobs established by the men during a period of standardization.

The training program should be set up to train all-round miners. All modern mining equipment is designed to be operated by anyone who has the physical capacity and coordination to be allowed underground. If the men are trained with all types of equipment used at the face, the problem of "over-specialization" can be avoided.

For example, if the loader operator can also drill there is little excuse for him to be idle while the jumbo is operating or to demand extraordinary rights or pay when the driller can also operate the loader. There will always be men who are more capable at one job than another and they will be better men if they understand all phases of an operation.

The personality of the teacher should also be considered. He must have patience and confidence as well as a knowledge of his work.

After miners have been given their original training, the supervisor generally carries on the daily instructions necessary.

The supervisor must be taught the essentials of mechanized mining and the organization of work at the face. The supplies and equipment must be so arranged by him that there is a

minimum delay in moving in and out so that the equipment may be kept operating the maximum portion of the available time.

Proper Service Cuts Delays

Service consists of providing the proper quantity of equipment, supplies, and transport according to a schedule. The quantity needed is predetermined by the planning, the time schedule by the cycle itself. Cycling is primarily a function of management, but service is a function of supervision. Only the supervisor, by his intimate knowledge of immediate conditions at the working face, can properly order the supplies and motor crews so that they are there in time to avoid delays. Service delays are a great factor in low labor efficiency and morale. Proper service is the best indication to the miner of man-

agement's sincerity and respect for his importance.

Although the number of cars and quantity of explosives, timber, rails, ties, etc., are determined by the plans and the cycle of operations, it might be well to note the compressed-air requirements of the jumbo and shovel loader. The air requirements for a jib jumbo are a line pressure of 90 psi with 1½-in. hose. The fittings on the hose should not be choked down to a smaller size. The smaller shovel loader requires the same pressure with a 1-in. hose and the larger one should have a 1½-in. hose. The efficiency of compressed-air equipment varies roughly as the air pressure; 70 lb of air will give about 70 percent efficiency. Machines should not be operated on less than 60 lb pressure. The dynamic or running air pressure should not be over 5 lb less than the static pressure.

A greater drop than this indicates an insufficient supply of air, probably induced by obstructions in the line such as small hose and fittings or valves not fully open.

Water pressure should be great enough to give a good stream from the water tube of the drill at a constant rate. The pressure should not be greater than the air pressure.

Another important aspect of service is underground maintenance. Modern equipment has been greatly refined as far as ruggedness and simplicity, but it does require visual inspection, occasional adjustment, and periodic lubrication. It has generally been found best to have an oiler who has been trained in lubrication, inspection, and performing minor adjustments to supplement the miners' efforts once each week. This man should be provided with a lubrication chart to be checked off with room for comments on adjustments to be submitted to the mine and mechanical superintendents immediately at the end of the shift. This man should

also be responsible for replenishing the miners' daily supply of lubricants each week. Weekly production records are also useful for each machine. It is as unreasonable to expect a satisfactory maintenance program without such records, as it would be to operate a mine without timekeepers.

Well-trained supervisors automatically check the condition of equipment and the sufficiency of supplies on their visit to the working place. These spot checks are important in preventing breakdowns of equipment and delays due to waiting for supplies.

Workers' Incentive

One of the important phases of mechanization is the attitude of the miner toward increasing his production commensurate with management's increased investment in equipment and the reduction in physical effort made possible by this equipment. In the early days of mechanization, this problem was simplified because of the availability of trained miners having a keen competitive spirit and the availability of experienced supervision that was able to properly evaluate the reduction in physical effort against the requirements of new mechanical skill. As the shortage of manpower increased, experienced miners and supervisors were replaced by men with insufficient background to obtain best results. In addition, there were further complications due to outside interference between management and miners.

As a result of these conditions, there were instances where management was forced to stand aside and see its expensive equipment converted into easier work and shorter hours but with no noticeable increase in production.

In other instances, management solved the problem to some extent by installing wage incentives. Occasionally, due to lack of an accurate estimate of the potential saving from

mechanization, the incentive rates were set too high and resulted in the miner adjusting his efforts to produce the maximum net income to him which did not necessarily mean that management was obtaining maximum results from its investment. From this it can be seen that an excessive incentive rate and a "low task" result often go hand in hand.

The best method to overcome the problems of a "low task" resulting from excessive incentive rates is to follow the program adopted by the management of the installations as outlined in this paper. Thoroughly analyze the possibilities of mechanical equipment, carefully determine the possible savings in labor cost if the miner applies himself, and then, based on these findings, plan a cycle to fit the job that will give maximum results. The incentive or contract rates should be set at a point where the miner receives what he considers to be an equitable split with management of the savings effected by his contribution of increased skill as against management's increased investment in equipment. Then, back up the plan with an organization of properly trained supervisors and miners imbued with the spirit of teamwork and pride in achievement and with properly organized service facilities. Management will then benefit by the direct advantage of a lower labor cost plus the intangible values of a high rate of productivity resulting from its investment in mechanized mining.

The incentive wage structure must be kept fluid to prevent the possibility of creating future "low task" results. A constant interest can be maintained by continual efforts to improve efficiency through trying new methods and developments in mechanization. Management will always find it to their advantage to maintain an experimental attitude toward mechanization.

Increasing Mineral Supplies

AS honored guest of the Montana School of Mines, Dr. James Boyd, director, U. S. Bureau of Mines, was presented with the honorary degree of Doctor of Science and delivered a commencement address entitled "The Contribution We Must Make." Dr. Boyd pointed out that "Today, with only seven percent of the world population, the United States uses 50 percent of the total world production of minerals. We consume, per capita, five times as much copper and three times as much lead, zinc, and steel as the rest of the world."

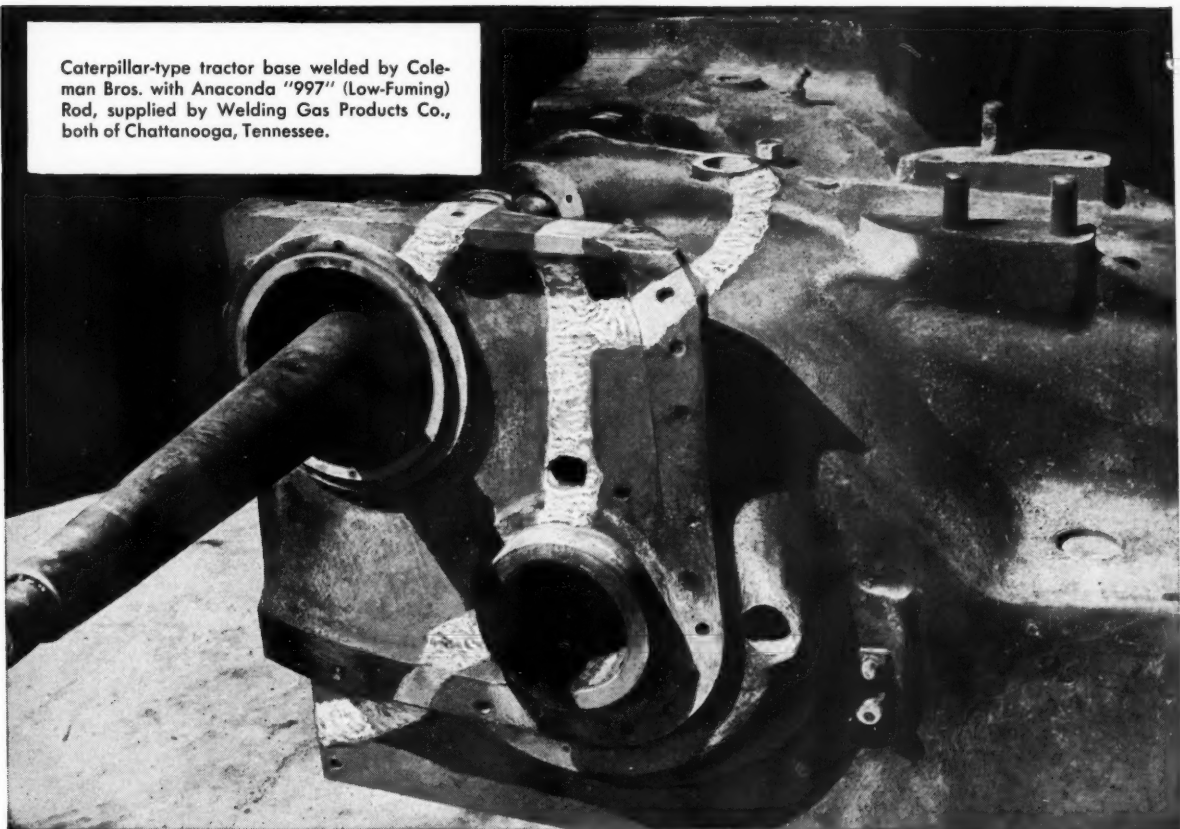
Dr. Boyd presented the problem

of meeting these ever-increasing demands as a challenge which the new graduates will share. He designated the new frontiers that these young men in mining will have to explore—the utilization of minerals now in abundant supply but not being used because of metallurgical or other problems, the conversion of marginal resources into commercial resources, the discovery of more economical and effective methods of recovery of minerals and ores, and the finding of suitable substitutes for minerals in dwindling supply.

He sounded a phase of engineering

life that is becoming of increasing importance—"You men of this graduating class will be faced with making important decisions other than those relating to your positions as mining engineers, metallurgists, or whatever profession you may choose. In other words, as citizens, and with the privileges and obligations that are yours as citizens, you will be called upon to make decisions that are basic to our American concept of Government, our social and economic structure, and our future policies both at home and abroad. Fundamentally, these decisions devolve on the questions of personal dignity, individual liberty, and a free world."

Caterpillar-type tractor base welded by Coleman Bros. with Anaconda "997" (Low-Fuming) Rod, supplied by Welding Gas Products Co., both of Chattanooga, Tennessee.



\$1,275 AND SEVERAL WEEKS' DOWNTIME SAVED **BY BRONZE WELDING**

IT LOOKED LIKE a costly accident when a caterpillar-type tractor in Chattanooga cracked its 2,000-lb. base. A new base would cost about \$1,500 with several weeks for delivery. But bronze welding came to the rescue!

Twenty pounds of Anaconda "997" (Low-Fuming) Rod was used in the 67-inch weld.

Grinding, preheating and oxy-acetylene welding took only 20 man-hours. Total cost of repair: \$225. And the tractor was back on the job in a few days. Moral: If your heavy equipment cracks or wears down—remember bronze welding.

Almost any part made of cast iron, steel, malleable iron, or copper alloys can be bronze welded quickly—at small cost. And well-made bronze welds in cast iron are stronger than the base metal itself.

Furthermore, with the low temperatures used in bronze welding—the weld area surfaces only are usually brought to a cherry red heat. This means less chance for warping or cracking.

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Here's What Operators Asked **about HEAVY-MEDIA SEPARATION** *at the Cleveland Coal Show*

Q. Does Cyanamid build cleaning plants?

A. No. Cyanamid does not build plants or manufacture equipment for them. You can design and build your own plant or contract for the design and construction of a Heavy-Media Separation plant through an engineering firm of your own choice. Several well-known firms have had considerable experience in the design and construction of complete plants and in Heavy-Media Separation units to supplement existing cleaning facilities.

Q. If you don't build plants, what does Cyanamid do?

A. Cyanamid acts solely as Technical and Sales Representative for Heavy-Media Separation Processes. We maintain extensive laboratory and testing facilities at the Cyanamid Mineral Dressing Laboratory at Stamford, Conn. where we can run continuous tests on your coal. We offer sound, unprejudiced counsel on what Heavy-Media Separation can do on your coal, based on these tests and on our many years of world-wide experience in the application of the process to coal and metallic and non-metallic ores. We work with your engineers on plant design and provide

the assistance of Cyanamid Field Engineers in tuning-up the installation.

Q. Why do you believe Heavy-Media Separation is the best cleaning method?

A. Actual plant tests. Heavy-Media Separation is the only process that closely duplicates "heavy liquid" results over a wide size range at any pre-determined gravity from 1.25 to 3.75. What's more, it is the only process that provides automatic, continuous and complete removal of large and variable amounts of refuse without volumetric limitation.

Q. That's claiming a lot. How do you know it's so?

A. Again, actual plant operation. You set the gravity of the Heavy-Media pool to the gravity you need to get the quality coal you want. From then on, the Heavy-Media Separation unit maintains that gravity continuously within ± 0.01 . Rejection of refuse is as certain as the force of gravity. Heavy refuse sinks, good coal floats.

If you wish, an automatic density control and density recorder can be provided to give you visual evidence of uniform performance.

Q. Yes, but isn't Heavy-Media Separation a relatively new and untried process?

A. In the metallic mining industry, Heavy-Media Separation has been in continuous commercial use for years. For coal cleaning, it has been used over three years. Twelve Heavy-Media Separation coal preparation units are operating satisfactorily; nine more are now being designed and constructed.

Q. Since we went to full-seam mechanized mining we send up everything we knock down. Can your process handle large amounts of refuse with sudden changes in the quality of the raw coal?

A. That's one of the big features of Heavy-Media Separation. Regardless of how the raw feed varies, it can handle the same tonnage and make the same quality. You never have to cut back your feed to let the cleaning units catch up with a sudden fluctuation in the refuse content of your raw coal.

Q. Supposing our shipping specifications change, how do you change the gravity?

A. By increasing or decreasing the relative proportion of magnetite and water in the Heavy-Media separating pool, the gravity can be quickly and easily adjusted to treat coal at any gravity you want.

Q. Does Cyanamid supply Magnetite?

A. No. Magnetite is a highly magnetic, common iron mineral which is finely-ground for Heavy-Media use. It's readily available in the proper grades as a low-cost commodity. Cyanamid has no self-interest in its production or sale.

Q. How much Magnetite is lost per ton of coal cleaned?

A. There's no exact answer possible. Let's put it this way. The magnetite medium is washed off the coal and the refuse recovered by the magnetic separators and continuously fed back to the separating vessel. Some does get lost. It varies with the feed and the plant. Plants are operating with make-up as low as 1/4 pound per ton of feed handled. Preparation engineers estimate loss of less than 1/2 pound of medium per ton of feed as a reasonable expectancy on any well designed and well operated unit. The cost of "make-up" medium is not an important factor.

Q. I notice some plants have "Cones" and others "Drums". Which is better?

A. It depends largely on the character of the feed. It's an engineering-design question which your engineers can best answer. Remember, however, *Heavy-Media Separation is a process* based on separation by gravity difference. It works efficiently and economically, independent of the shape of the vessel in which the separation takes place.

Q. Which is better — a "Package Plant" or a "Custom Built Plant"?

A. Again, it all depends. Preparation plant engineering firms offer both. There are quite a few "package plants" doing a fine job on operations cleaning 100 tons-an-hour or less. On the other hand, the largest bituminous cleaning plant ever built naturally has "custom built" Heavy-Media Separation units as essential components. Preparation engineers can best decide which is best for you!

Q. Our cleaners are practically as good as new. They may not recover all the good coal, but we can't afford to junk them. Don't a lot of operators tell you that?

A. Yes. But a lot of operators with fairly modern plants are considering Heavy-Media Separation to supplement their present washers. A number of present Heavy-Media Separation units were installed as auxiliary units to improve quality, cut bank loss and increase capacity at low capital cost.

Q. I've been watching that scale-model working. Does the coal separate from the refuse that fast in a full-size plant?

A. Yes, indeed. On full-size plants, marked pieces of coal and slate show up on the respective screens in 6 to 10 seconds after entering the Heavy-Media Separation vessel. That's one reason why clay contamination or slimy-refuse isn't a problem with a Heavy-Media Separation unit.

Q. Do you have any printed material on Heavy-Media Separation?

A. Yes. We'll be happy to send you *Mineral Dressing Notes #16 — "Coal Preparation"* which has 38 pages of interesting data and test results on both Heavy-Media Separation and the Dutch State Mines Cyclone Separator Processes.

AMERICAN Cyanamid COMPANY

MINERAL DRESSING DIVISION

30 ROCKEFELLER PLAZA



NEW YORK 20, NEW YORK

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MORE DURABLE...
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Now, after completing exhaustive tests, Crane presents this better diaphragm valve—better suited for more services under today's working conditions. Stemming from basic improvements, such as the radically new bonnet-sealing and valve-seating arrangement, this original Crane design introduces many outstanding service features like those shown here.

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- 2. POSITIVE SHUT-OFF** in case of diaphragm failure. This is an exclusive Crane safety feature.
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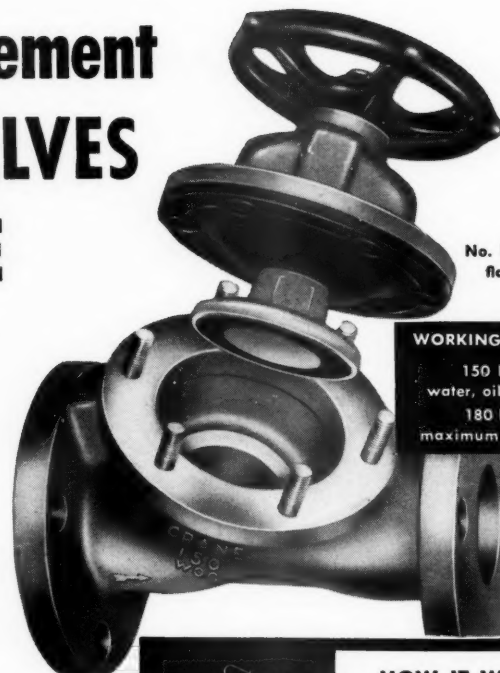
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water, oil, air or gas
180 Deg. F.
maximum temperature

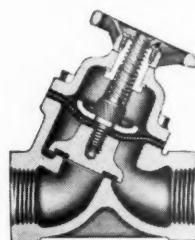
HOW IT WORKS

The Crane diaphragm serves one function only—sealing the bonnet. It is not subject to crushing and rapid wear. The seating member is a separate circular flat face disc, firmly attached to the stem and joined to the diaphragm with a special leakproof connection. This independent seating feature permits positive shut-off with no loss of fluid, even in case of diaphragm failure.

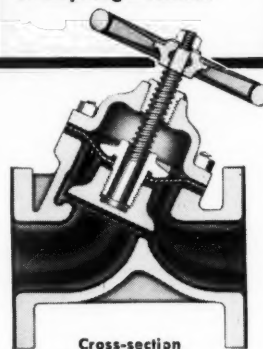


Valve Open

Valve Closed

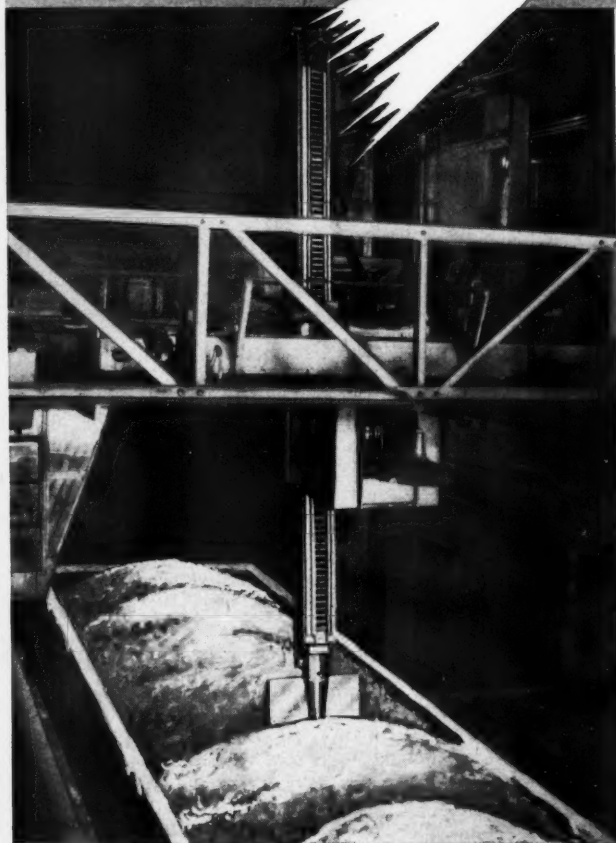


Cross-section, No. 1610, unlined, screwed ends.



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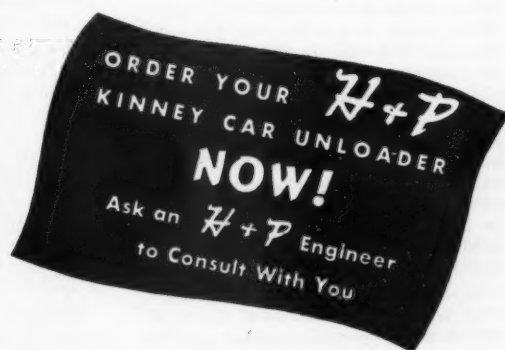


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Open-Pit Mining in Australia



Loading overburden with Tournapull and Carryall

American Stripping Equipment Supplements Underground Coal Production

By H. BOWDEN FLETCHER

UNTIL comparatively recent years all of Australia's black coal requirements were obtained from underground mines, but due to the increasing demand of industry it has been found necessary to develop open pits in an effort to keep pace with the constantly increasing requirements.

Except for Queensland, most of the black coal requirements are supplied from New South Wales coal fields where, in spite of a big increase in the mechanization of old mines and the opening of new completely mechanized mines, output has not kept pace with demand and, in fact, the output per man has declined seriously over the last ten years.

Output from open pits has now reached the rate of 2,000,000 tons annually and arrangements are now in hand for the development of new open-pit mines on a large scale. It is hoped to increase production to 3,000,000 annually by the end of 1949 in New South Wales alone.

In Queensland, in the Blair Athol field where the coal seam is up to 200 ft deep, open-pit mining, now on a small scale, is to be developed with an output of 3,000,000 tons annually as the target. This scheme, however, involves the development of a new coal port and the construction of a new rail link between mines and port through rough mountain country and must take many years to implement.

It is realized that, if Australia is to expand its industrial activity, more and more coal will be required and this can only be obtained by large scale open-pit operations and plans are now being prepared with this in view.

In New South Wales one of the best examples of open-pit mining by the full use of modern earth-moving machinery is located at Muswellbrook where, in order to maintain an output of 2500 tons of coal per day, the contractors, Messrs. Thiess Bros. Pty. Ltd., have to move 3800 cu yd of overburden daily. This has been accomplished by the full use of mechanical equipment.

Operations were begun by the contractors about four years ago on behalf of the owners, the Muswellbrook Coal Co. Ltd. In that period 3,750,000 cu yd of overburden have been moved for an output of 1,250,000 tons of coal using 11 Le Tourneau self-propelled scrapers, 12 Caterpillar tractors (chiefly D8 models) fitted with dozers or heavy carryall scrap-

ers, 3 Le Tourneau and Caterpillar DW-10 dump wagons with a capacity of 17 and 14 cu yds capacity respectively, a group of six power shovels and some 20 tip trucks of 8/10-ton capacity and much auxiliary equipment.

Planned Maintenance

In order to sustain the desired output and keep the working equipment in first class condition, special maintenance and repair facilities have been erected on a location about 1 mile from the pit. Repair work is handled by a subsidiary, Messrs. Thiess Bros. Repairs Ltd. A large workshop is equipped with all the essential machinery, including a Simmonds lathe, a Vial Grinder, power hacksaw, Fairfax shaping machine, and a special mobile hydraulic track press powered with a 15 hp Allis-Chalmers engine. This machine, which is one of the key items, plays a major part in keeping track-type equipment on the road and operating at full capacity. This hydraulic press

has a mechanical spanner that applies tension through a hydraulically operated clutch. An ejector pushes out the track pins automatically and replaces them when the track is being reassembled. The track is fed over a platform fitted with rollers.

Normal daily maintenance is also handled by a special staff which begins work at 5:30 am and greases, oils, refuels and checks equipment so that the operating staff can take the machines on to the job by 7:30 am.

About 100 men are now employed, comprising chiefly equipment drivers, fitters, and mechanics working on a two-shift basis. They have been housed in ex-Army huts erected in the vicinity of the pit and made as comfortable as circumstances will permit.

To facilitate rapid movement of

In contrast to the conditions usually encountered in the USA, this Australian producer has a relatively simple problem—a thick seam with only a 3 to 1 ratio of overburden to coal. Even with the comparatively light equipment used, local factors make possible high production.

equipment and motor trucks, the first job was the construction of the essential access roads, of which there are approximately seven miles, and their maintenance in first class condition to carry big loads at high speed. The surfaces have been built from material taken from the overburden of the pit as it is removed and the constant use of the water cart and regular grading by a Caterpillar D12

using a 12-ft blade has been entirely satisfactory.

A tipper truck fitted with 1000 gal water tank, to which is connected a spray, is used for watering and the essential head is obtained by tipping the body of the truck slightly. The watering, in addition to keeping the road surfaces firm, helps considerably in keeping down the dust nuisance so prevalent on unsealed roads.

Access roads are built to a standard width of 30 ft, providing ample room for two-way traffic in heavy vehicles without any risk of collisions and at the same time enabling high speeds. The roads into the pit are relaid as the work proceeds and access is required to new working faces.

When the Caterpillar D12 is not grading roads it is moved to the spoil dumps, where it is used to spread the overburden as dumped by the dump wagons and also in grading the equipment yard to keep out the ruts caused by the constant movement in and out by heavy working plant.

Rippers Break Overburden

The overburden, which consists of hard clay and shale with sandstone floaters, is in a ratio of 3 to 1 in relation to the coal, of which there are three seams totaling 69 ft in depth. Overburden is stripped by Le Tourneau, self-propelled scrapers and moved by them to spoil dumps, from which back filling takes place, to areas from which all the coal has been excavated. The Tournapulls maintain maximum safe speeds and the loads maintained have fully justified the policy of laying down wide good-surfaced roads, the average grade of which is 8 to 1.

On those sections where the overburden surface is extra tough, Le Tourneau and Armstrong Holland rippers, towed by Caterpillar Tractors (D8), are used to break the surface for the mechanical loading equipment to get its teeth into. The rippers are actually of a five-tine capacity but the toughness of the ground permits the use of only two of them but, even with this reduction, the use of tractors fore and aft is quite often necessary. Where the sandstone floaters occur, the Caterpillars with dozers are called into operation to push them out of the way.

Once the rippers have satisfactorily completed their work, the spoil is



Typical conditions at the Muswellbrook operations



Tough surface is broken with a tractor-drawn rooper



Steam shovel loads trucks that take coal to rail line

loaded by the Le Tourneau, self-propelled scrapers and tractor-drawn scrapers of 12-15-cu yd capacity and moved on a $\frac{1}{4}$ mile lead to spoil dumps where it is spread by the Caterpillar D12 grader. On the longer leads which range from 3000-4000 yd the dump wagons are used to move the overburden direct to areas from which the coal has been removed. Dump wagons are loaded by a 2-cu yd Lima Diesel power shovel.

After the overburden has been removed, the fragmentation of the coal, which averages about 25 ft deep in each seam, is obtained by blasting with gelignite so as to make it small enough for the power shovels to load into the 8/10-ton tipper trucks for movement the $1\frac{1}{2}$ miles to the railway siding where they load direct into the rail trucks for distribution throughout the state.

It is the normal procedure to bore firing holes, using IR compressed air drills, to the full depth of the seam being worked, 25-30 ft as the case may be, in benches about 70 ft wide and as long as the outcrop. Sufficient explosive and holes are used to break the coal small enough for easily handling without the need for further blasting of over-size lumps.

Light Loading Equipment

For loading the coal into the tipper trucks, which are chiefly Macks, Ford, International, and Whites, a 2-cu yd Lorain and a $1\frac{1}{2}$ -cu yd North West are operating while a 2-cu yd Lima is engaged on overburden work.

As Thiess Bros. Pty. Ltd. are working open pits at Ben Bullen, 140 miles away in New South Wales and at Blair Athol in Queensland, about 900 miles away, in addition to other excavation jobs in various parts, rapid movement of the executives and engineers with quick transport of urgently needed heavy-equipment spares is of paramount importance in keeping the various jobs moving. To provide this essential service the firm has a twin-engined, low-winged monoplane. Due to the break of railway gauge between New South Wales and Queensland, the time involved in the movement of equipment items by rail be-

tween the firm's various jobs is too slow and unreliable to be of any real use. Hence the aircraft is essential to provide this vital service.

With the quantity of heavy equipment in use on this job, the system of overhaul work is planned on an hours-worked basis. In the case of tractors this is fixed, on overburden work, at 2000 hours. With the dump wagons and self-propelled scrapers maintenance is provided as they come off the job. It is the guiding principle of the maintenance gang that these valuable machines must never be permitted to be idle for lack of thorough maintenance.

Consideration

AT the commencement of the Missouri School of Mines and Metallurgy, the degree of Doctor of Engineering was conferred upon Andrew Fletcher, president, St. Joseph Lead Co., who pointed out the required characteristics that technical men should build on their foundation of engineering training.

Mr. Fletcher stressed consideration as the first floor of the structure and courage was marked as the second floor. As a third floor to be built on the technical foundation Mr. Fletcher named loyalty to oneself, loyalty to an employer, and loyalty to one's country.

In the course of his stirring address he stated that the United States with only six percent of the world's area

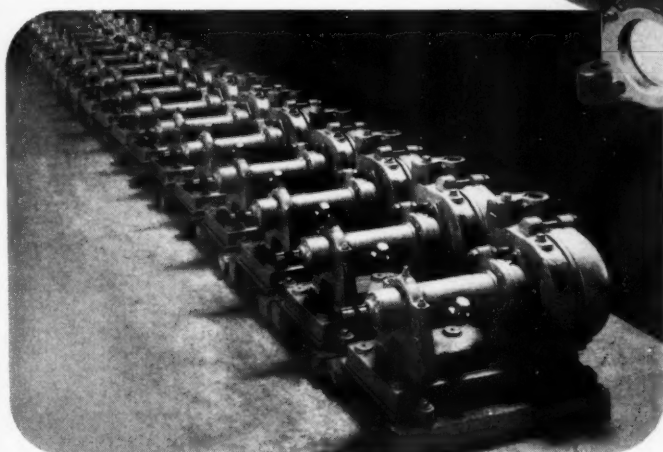
and only 1/16 of the world's population, in only 150 years, constructed and retained the ownership of 46 percent of the world's electric power, 48 percent of the radios, 54 percent of the telephones, 59 percent of the steel capacity, 60 percent of the life insurance policies, and 85 percent of the automobiles. As the reason for this achievement he said "America has the one thing that other nations lack, it is the American system of free enterprise, in which the investor, the producer and consumer have freedom of choice and opportunity, and by which we have a way of life in which the people themselves own the productive facilities, not the Government, or the politicians, or the Army, or the police."

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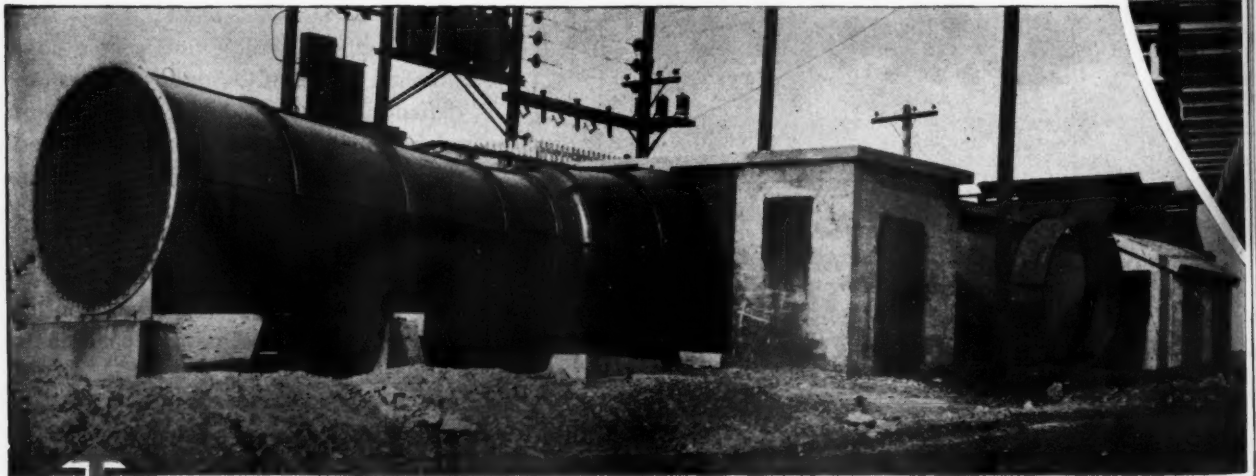
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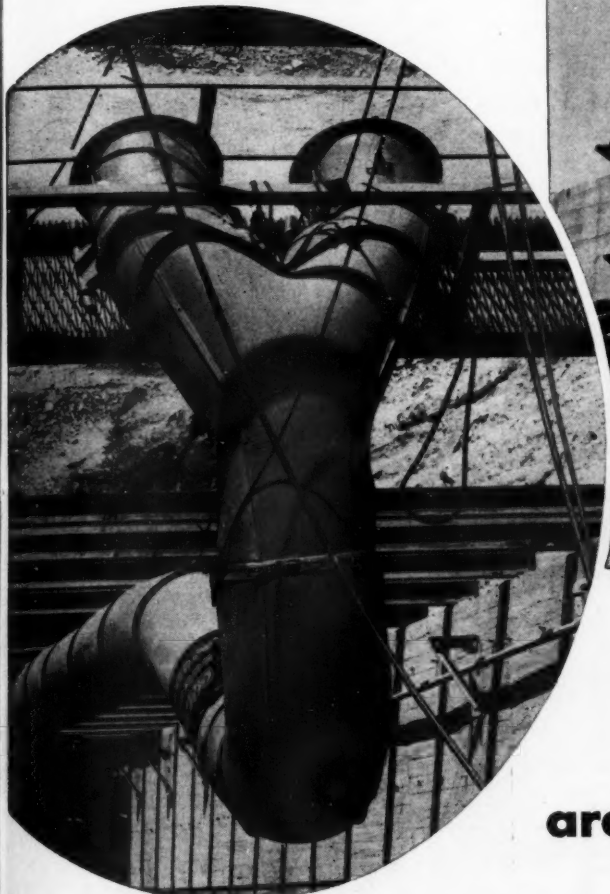
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Right: a twin installation of Type I-21
JOY AXIVANE Blowers at a large
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BLOWERS

Below: the same twin units, looking
down. Left, opposite page: a typical
JOY AXIVANE Exhaust Mine Fan
installation, at another metal mine.



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Structure Drilling Wash Ore*

Current Practice Results in Improved Sampling

By R. R. WEIDENFELLER

District Chief Engineer
Oliver Iron Mining Co.

TYPICAL wash ore is composed of alternating layers of high grade iron ore and fine, free sand. When mined, it breaks up into chunks of ore and sand. Such ore reflects the amount of leaching that has been done and ranges from a free washing ore in which the sand is separated from the iron mineral to banded taconite where no leaching has been done and the bands of iron and silica are in the original hard unaltered state. Wash ore predominates on the western Mesabi Range. Nearly all the ore produced west of Nashwauk is of this type.

Early in Mesabi history drilling was done in Itasca County, in the 90's. At that time a small amount of direct ore and a great deal of sandy ore was found. Due to the business recession of 1893, exploration stopped on the western end of the range and when work was resumed, activities were centered on the eastern Mesabi Range where high grade ore bodies were known to exist.

It was still felt that the sandy ores had possibilities and in 1901 a carload of ore was shipped from the Arcturus shaft, near Marble, to Georgia for treatment in a log washer. Results were satisfactory but the interested parties lacked capital so the mine option was dropped. In 1904 the Oliver Iron Mining Co. took an option on the Arcturus property and later secured the lease. Having confidence in being able to concentrate these ores, the Oliver Co. enlarged its holdings and began stripping and development of mines in the Canisteo District. They erected a pilot mill on the west side of Trout Lake and conducted experiments during 1907 and 1908. These experiments led to the building of the present Trout Lake washing plant in 1910. This pioneering in the field of concentration of wash ores by the Oliver, made possible the utilization of these ores and thus greatly increased the life and reserves of the Mesabi Range.

* Presented at University of Minnesota drilling symposium, April 1949.

Early Drilling Gave Erroneous Results

With the exception of a few places where ore was exposed, the bulk of the iron deposits on the Mesabi Range were under glacial till, which necessitated extensive drilling both for exploration purposes and to determine pit limits for mining purposes. Drilling started in the 1890's and worked westward across the range. Spacing of drill holes in the Western Mesabi

in the ore formation and if some silica was lost due to improper handling of the sample, the iron result was higher than its true value. Diamond drilling was often employed in drilling soft material that would not core and as a result sludge was the only part available for analysis and study. Sludge is not a satisfactory sample and usually information based on sludge analysis is erroneous. These errors would not be so apparent in drilling direct ore but did have a considerable influence in distorting the results on wash ore.

The method of collecting the ore samples accounted for one of the major errors in the early churn drilling in wash ore bodies. The sample was collected in small containers or barrels and much of the fines were washed away in the overflow and lost, thus increasing the proportion of iron in the sample.

Reversing Water Flow Decreases Errors

Structure drilling predominates today in exploration of wash ore bodies, because of the errors which crept in when using straight churn drill methods. To meet this problem, John



Screening the sample—Note bit on board near screen

varied, in some cases five holes per forty were drilled in the main ore bodies, in others holes were drilled in 300-ft centers with one hole drilled to quartzite in many forties. Churn drills and diamond drills were employed, the diamond drills being used for harder material.

Churn drilling augmented by diamond drilling served the purpose in direct ore but results obtained from drilling wash ore were not as reliable. Churn drilling tended to free the silica

S. Schultze, formerly with E. J. Longyear Co. and later a drilling contractor in Grand Rapids, devised a method, commonly referred to as "structure drilling."

This method of drilling is comparable to churn drilling with one important difference, namely the flow of water is reversed. In churn drilling, water passes down the center of the rods and forces material up between the rods and the casing. In structure drilling the water flows down between

the rods and the casing and the broken material rises through the rods.

The normal drill crew comprises three men, a driller and two helpers. Equipment used in structure drilling is essentially the same as that used in churn drilling. In fact, as shown on the accompanying sketch, a churn drill can be easily adapted to structure drilling. Thus the structure drill can be an adapted churn drill with a special power drum attached or a simple tripod arrangement under which a source of power is installed, usually a gas engine, which turns the drum. In either case the rope operates from the drum, over a single pulley and down to the hammer or rods.

At the lower end of the casing a shoe or coupling is screwed on to protect the end of the pipe from being battered when driving. The upper end of the casing is equipped with a 3-in. heavy driving tee; a striking collar against which the hammer for driving the casing works; a 3-in. extra heavy coupling above the striking collar; and a 3-in. nipple coupled with a packing gland that allows the 2-in. washrods to work up and down and yet holds the water pressure inside the casing. The wash rods are longer than the casing and are fitted with a drill bit at the bottom and a gooseneck or crosshead at the top. The

record must be kept of the lengths of casing and rods as they are used. The length of casing should be determined before pulling casing or before blasting, and it must be back to its original depth before drilling is resumed and sample again collected. After washing down the casing, the hose should be emptied of coarse material before it is allowed to discharge into the tank. Too much care cannot be taken in watching the depth the drilling rod extends below the bottom of the casing, from 4-6 in. is allowable. The most representative samples are secured when the bottom of the casing is maintained close to the elevation of the bottom of the hole.

The drilling itself is done by driving down a standard weight casing pipe usually 3 in. in diameter and drilling or chopping and washing to the surface the material at the bottom of the casing. This is done by raising and dropping the rods so that the bit at the bottom cuts or chops the material. A 300-lb or heavier hammer drives the casing down or loosens it as is necessary. In drilling surface the water enters the drill rod as in regular churn drilling. The material is wasted as it comes up. When boulders are encountered they are shattered by blasting. Dynamite is lowered down the hole and the casing is pulled to a safe elevation, about

to hard ore or taconite layers. A diamond drill proves of value whenever the structure drill strikes a hard seam of taconite as progress is greatly retarded if the structure drill is used for this class of material. It often takes days for the structure drill to chop down through relatively thin layers, whereas the diamond drill can pass through these hard layers with comparative ease. If a soft layer is discovered below the harder one, the diamond drill hole can be enlarged by blasting, the casing forced down and chopping resumed. However, if the layer continues hard, the hole can be discontinued and money and time are saved.



Structure steel bit

Satisfactory results can only be obtained by a driller experienced in iron formation. This experience must be under actual operating conditions over a period of several years. The prime object of drilling is to obtain a reliable sample at a sacrifice of speed of progress.

The experienced drillers prefer the rope and drum type operation over the mechanical equipment, thus they can feel the drill rod reaction through the ore formation and record such variations on their daily drill report, which information is helpful for classification purposes.

The sampling of unconsolidated material has always been a major problem. Its solution is essential to good evaluation. The method described here, as used on the Mesabi Range in Minnesota, may well be applicable to sampling other ores where similar conditions exist.

Sampling Methods

Samples are sacked and tagged by the drillers and collected at the drill by the laboratory department. Each 5 ft of hole represents a sample. As drilling progresses the sample discharge, which includes coarse and fine material and drilling water, is collected in a tank about 5½ ft in diameter, 2½ ft high and has a capacity of approximately 260 gal. The discharge spills out on a screened frame ten mesh or finer, placed over the tank so that the coarser material will remain on the screen and the driller can see what material he is encountering. When the tank is full, it is allowed to settle, generally about an hour, and the water is permitted to drain out through a series of plugged openings in the tank, starting with the top one first, until the final water left in the tank is decanted off and the fine sample is saved. Settling time differs according to material being drilled, paint rock in particular settles very slowly. Lime is added to the tank in this case to reduce settling

gooseneck serves as the outlet for the sample and water, through an attached hose. This material is carried through the hose to the settling tanks, or wasted, as desired. When chopping, the rope for lifting the rods may be attached to the gooseneck. When drilling, a man stands on an elevated platform where he can move the gooseneck to turn the pipe to allow the bit to do a better job of chopping. The water is applied under pressure at the driving tee and is forced down between the rods and the casing. It enters the 2-in. driving rods at the bit and rises to the gooseneck and discharge hose carrying with it the material loosened by the chopping action. The bits have an opening of 1¼ in. when new, which limits the size of sample. Bits are tapered on the inside to prevent blocking.

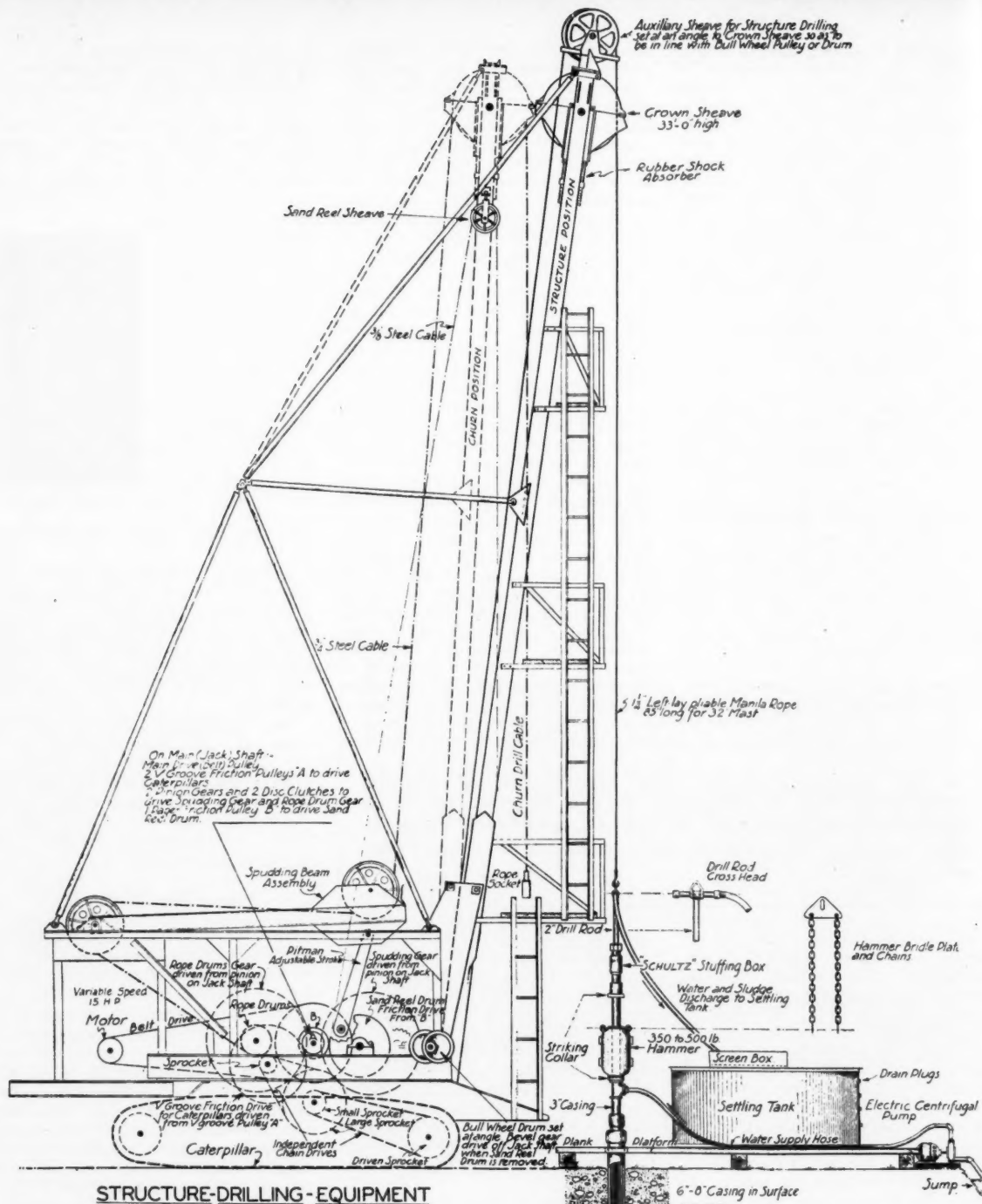
As in the case of regular churn drilling, all pipe connections must be kept tight and care must be exercised in removing wash rods and pulling casing before blasting. A careful

10 ft above the blast. Following the shot, the casing is immediately hammered back to the original position and drilling resumed. The discharge flows into a bucket so the operator can see when ore formation is reached.

When it is reached it is customary to drill several feet into ledge, then wash down a 4½-in. secondary casing over the 3-in. casing and collar the 4½-in. casing in solid ledge. This precautionary measure keeps the surface from contaminating the ore samples.

Decomposed taconite, fine sand or loose ore is often encountered in drilling. The caving action of this material often makes the casing so tight that it is exceedingly difficult to move. When it is pulled up, the caved material must be washed out before drilling is resumed. In some cases a 6-in. casing is washed down to ledge over the 4½-in. casing for added protection when the small casing is extended deep into the formation.

The structure drill is not adaptable



STRUCTURE-DRILLING-EQUIPMENT AND OPERATION

When drilling, drill rope is hooked on to drill rods cross head - when driving or pulling casing it is hooked on to hammer bridle plate.

The drill rope passes over crown sheave and down to bull wheel or pulley. Drill operator wraps 3 or 4 turns of drill rope around bull wheel which rotates counter-clockwise. By alternately tightening and releasing free end of rope as it comes off of bull wheel, any length or speed of stroke may be obtained.

Drill rods drop by gravity to give blow and when driving casing, hammer strikes against lower striking collar or ring or against upper striking collar when pulling casing.

For best results, casing should be kept within 6" of bottom of the hole.

Water under pressure reaches bottom of the hole through the casing and returns to the surface through the drill rods, carrying the sludge and chippings which are discharged through a hose into settling tanks.

time. The number of tanks per 5-ft sample also varies according to the material, but averages about three. The fine material from each tank is placed in a drying pan and put over a fire. The coarse sample is similarly dried and the two are mixed together and put in a canvas sack to be picked up by the sample truck. Such a sample will weigh 50-70 lb. Care must be exercised in drying the sample to avoid loss of the natural moisture, organic, and volatile material. Care also must be taken to obtain all of the sample, as loss of any part would lead to incorrect results.

Analysis Procedure

Samples are placed in canvas bags at the drills and taken to the laboratory for analysis. There they are quartered, one sample of crude ore and one handwashed plus 80-mesh sample are put in tin boxes and filed for visual inspection and study. Chemical analysis is made on part of the remaining sample and results are reported on the crude ore and the plus 80-mesh fraction. The plus 80-mesh sample is obtained by handwashing a portion of the crude ore after crushing to pass a $\frac{3}{4}$ -in. screen. The reason for running both the crude and a plus 80-mesh sample is that the crude represents the best information available on the ore in place while the plus 80-mesh approximates the wash-

ing plant results under standard wash treatment.

Analytical results include the percentage of iron, phosphorus, silica, and manganese plus additional figures on sample weight and weight recoveries. Certain limits are set, based on the percentage of iron in the sample, to avoid needless expense in running complete analysis on each sample. When the iron in the plus 80-mesh sample is below 40 percent, only iron is shown in both crude and plus 80-mesh analysis. If it is between 40 and 50 percent, a complete analysis is run on the plus 80-mesh and iron and silica on the crude. If the iron is over 50 percent in the crude, complete analyses are run on both crude and plus 80-mesh. Aluminum is run as requested and generally is limited to paint rock and Cretaceous ore material.

The remaining portion of the drill sample is sacked and saved for experimental work unless the analysis indicates it can be wasted. Neither high-grade ore nor lean waste ore is kept since the high grade will be mined and the lean waste (minus 20 percent iron in crude and minus 35 percent iron in plus 80 mesh) is so low in iron that it cannot be classed as ore under any predictable method of concentration now known.

After the sample has been obtained and the analysis run, the next problem is to utilize this information in the

best possible manner. The drill hole is plotted on the section. Both crude and plus 80-mesh analysis are plotted opposite the footage they represent. These are both placed on the section, in order to see at a glance if the ore shows concentrating probabilities, that is, if the silica in the plus 80-mesh analysis is much lower than that in the crude analysis.

A classification is made by using the analysis as a guide plus visual examination. Visual examination is most important in determining ore structure. Two crude ores may have identical analysis with the same iron-silica ratio but one ore will wash and the other will not, the difference being that in one case the iron and silica are separate from each other, in the other case they are adherent. In classifying, nearly every company has its own system but a classification covering the main subdivisions should include, decomposed taconite, taconite, paint rock, standard wash ore, lean wash ore, and retreat ore.

Decomposed taconite is taconite that has been leached and has been broken down to the point of being crumbly. Taconite is an original dense and hard iron formation. It occurs as the walls and bottom of the ore bodies and some taconite is found in the ore bodies, where complete leaching has not taken place. Paint rock is the slate horizon marker of the iron formation and al-

(Concluded on page 58)



Churn drilling through surface material in preparation for structure drilling



Structure drilling with truck-mounted rig

Cost Savings By Pillar Recovery

THIS report covers a mine operating all track-mounted equipment—with 10-ton mine cars loaded mechanically at the working faces. The seam is the Pittsburgh, approximately 7-ft high, with the customary draw-slate roof. It is top cut with two side shears and any slate that comes down with the cut is loaded with the coal and the "full seam" is cleaned at the surface preparation plant. The mining plan is the block system with narrow rooms and entries. A panel is developed by a series of eight headings which are driven to the barrier limit; rooms are then turned to the right and left, and the blocks mined retreating. The plan is shown in detail on the accompanying sketch. Pillars have been mined successfully by this system for a number of years, and it is estimated that a 90 percent recovery is made. To illustrate possible cost savings with high extraction, this report compares the present operation with a conventional room and pillar system also shown on the accompanying sketch. In this latter case, it is assumed that 65 percent of the coal in the panel would be mined in the advance work and that no further recovery would be made.

The main reason for making a high rate of extraction at this mine is to conserve the coal—which is an excellent metallurgical fuel—by recovering

An Increased Tonnage Yield Will Lower the Costs for the Mining Supplies and Material, the Plant and Equipment, and the Coal Property

By G. N. McLELLAN

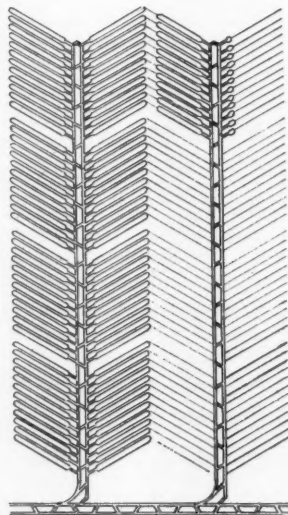
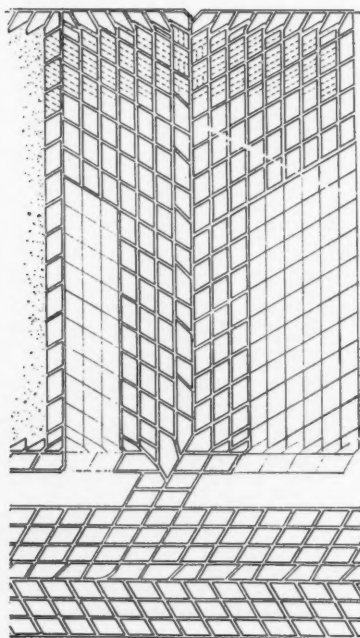
The reports presented here by G. N. McLellan and D. C. Ridenour are a part of the study being made by the American Mining Congress Committee on Roof Action. Various factors affect the cost of pillar mining and the purpose of the Committee is to show how these should be evaluated in estimating the probable economy of making a high coal extraction.

the highest possible tonnage from the property. In common with usual experience, and based on averages of a period of years, the actual face cost of the pillar coal is estimated to be approximately ten percent higher than

the cost of the coal mined from the narrow work. However, this ten percent increase is offset by various savings in the high recovery system. A greater yield per acre results in a lowered purchase price per ton for the coal in place. The cost per ton of coal of the material used in a working panel is lowered by a greater tonnage produced from the panel. The investment cost for plant and equipment is lowered because the greater yield increases the operating life of a property. The amounts of these savings are illustrated in the following discussion but there is a further advantage that is not reducible to dollars and cents; the concentrated workings where there is a high percentage of extraction results in a more efficient use of the operating facilities by reducing the amount of travel in a panel for the supervisors, the men and the equipment.

Panel Material Cost

The typical panels shown in the accompanying sketch are each estimated to have an area of 48 acres and to contain 560,000 tons of coal in place. At a 90 percent extraction, there would be 504,000 tons recovered from the block panel, and at a 65 percent recovery, 364,000 tons from the room and pillar panel. The accompanying table shows the amount and cost of material in each mine for track, wiring, ventilation, sprinkling, and timbering, and it will be noted that different amounts of these items are used in the two systems. Based on the recoverable coal in each panel, the table further shows that the panel material cost in the 90 percent recovery is 15.5c per ton, as compared to a cost of 29.8c per ton in the 65 percent recovery—a saving of 14.3c per ton in favor of the high extraction. A further item of interest is that the block panel would be in operation for 420 working days while the room and pillar panel would be completed in 303 days.



TYPICAL MINING PANELS
Left—Block System with 90 per cent recovery.
Above—Room mining with 65 per cent recovery.

Cost of Coal

In a seam with a mining height of 6 ft, one acre would contain 10,000 tons; a 90 percent extraction will yield 9000 tons per acre and a 65 percent extraction 6500 tons. Then assuming that the purchase price of the coal land is \$500 per acre, the cost of the coal in each method of mining would be:

Extraction Rate	Recoverable Tonnage	Per Ton Cost
90%	9000 tons	5.5c
65%	6500 tons	7.7c

Capital Investment

A property of 3000 acres, with coal at 10,000 tons per acre, would contain 30,000,000 tons, and at extraction rates of 90 percent and 65 percent, the property would yield 27,000,000 tons and 19,500,000 tons respectively. Then at an assumed production of 1,500,000 tons per year, the property at 90 percent extraction would have a life of 18 years, and at 65 percent extraction,

a life of 13 years. Then further assuming that the capital investment for the plant and equipment, after salvage, would have a value of \$3,000,000,

the investment cost and per-ton charge based on an annual production of 1,500,000 tons in each case, would be as follows:

Extraction Rate	Annual Investment	Charge Per Ton
90%	\$167,000	11.1c
65%	\$230,000	15.3c

Summary

As shown in the following summary, the foregoing various savings add up to quite an appreciable sum—nearly 21c per ton.

Summary of Costs Per Ton

	90% Recovery	65% Recovery
Material	15.5c	29.8c
Coal	5.5c	7.7c
Investment	11.1c	15.3c
Total	32.1c	52.8c

It should of course be understood that these cost comparisons are to some degree theoretical in that they cannot be applied to any particular mine. However, they do illustrate the way in which comparative costs can be calculated. The particular purpose of this report is to illustrate that although a higher day to day cost might be experienced in pillar recovery, a long-range view covering the completion of a panel or a property, brings savings that may completely offset the daily cost and swing the final cost into the credit column for the pillar mining.

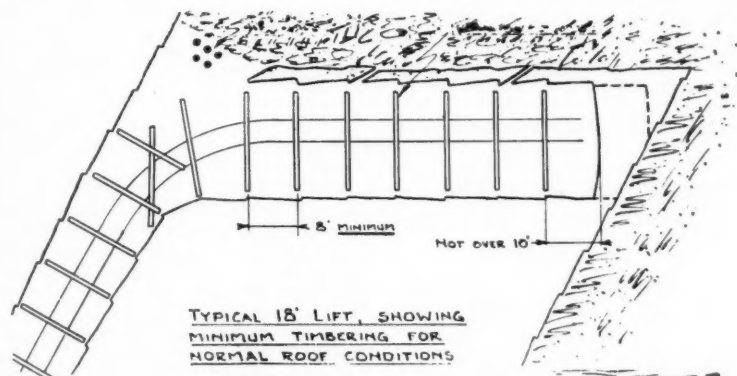


TABLE I. PANEL COSTS FOR MATERIAL INSTALLED

Material in Place	90% Recovery		65% Recovery	
	Amount	Cost	Amount	Cost
TRACK	10,400 ft		12,200 ft	
Ties	4,200	\$5,250.00	4,900	\$6,125.00
Rail—ft	20,800	10,400.00	24,400	12,200.00
Turnouts	52	5,628.00	56	6,061.00
WIRING				
Rail bonds	1,400	\$40.00	1,100	\$60.00
Cross bonds	70	\$4.00	80	\$6.00
Trolley—ft	6,300	2,356.00	8,700	3,254.00
Feeders—ft	3,700	925.00	8,000	2,000.00
VENTILATION				
Stoppings	102	2,448.00	24	576.00
Doors	64	960.00	16	240.00
Canvas—ft	2,000	200.00	2,200	220.00
SPRINKLING				
¾-in. pipe—ft	8,000	640.00	8,000	640.00
2-in. pipe—ft	5,000	1,275.00	5,000	1,275.00
TIMBERING				
12-ft bars @ 2.00	7,300	14,600.00	1,100	2,200.00
16-ft bars @ 3.00	4,000	12,160.00	14,400	43,776.00
8-ft posts @ 58c	22,600	13,108.00	50,800	29,464.00
Cribs	450	6,615.00		
Total Material Cost		\$77,489.00		\$108,787.00
Tons Recoverable Coal		540,000.000		364,000.000
Cost per Ton of Recoverable Coal		\$0.155		\$0.298



Increased Cost of Pillar Recovery

THIS report has as its object determining the difference in direct cost and depreciation between full extraction and partial extraction under a heavy roof that is difficult to support. The estimates presented here are based on actual pillar recovery operations. The mining plan used is the block system, where a panel is developed by 12-ft entries and 14-ft rooms, and the blocks between the rooms are recovered open-end by cutovers 18 ft wide. The operation is all mechanical, with tractor loaders and shuttle cars. The seam is the Pittsburgh which has an average height of 62 in. of coal and the typical Pittsburgh roof; a 12-in. draw-slate which must be supported at close intervals or taken down immediately after the cut is loaded. Above the draw-slate there are 4 to 5 ft of slate and roof coal, overlaid by a strong, heavy shale which cannot be broken in pillar extraction unless all stumps of coal are removed. The hard fire clay bottom makes a good road bed for the shuttle cars except that water quickly softens it and makes haulage impossible.

The estimated costs in Table I, based on the foregoing conditions, indicate that partial mining would be \$.229 per ton cheaper than full extraction, but this figure can be applied only under the specific mining conditions for which the estimate was made. For instance, approximately 48 percent of the draw-slate is being held with timbers, the rest comes down and is loaded out, but in a partial mining method, it is believed that 95 percent of the slate could be supported. This would be a decided advantage and would tend to make partial mining cheaper under the soft draw-slate as occurring in this mine, but would not necessarily apply under some other types of roof. In this study the cost of depleting the coal has not been considered, and no attempt has been made to evaluate the cost of depleting the tract at an increased rate.

Method of Estimating Costs

Face Cost is estimated on the basis of the expected production of a crew in the block system in which 48 percent of the slate is held in place against the expected production of a crew doing partial mining in which about 95 percent of the slate could be held. The partial mining lends itself to faster shuttle-car hauling and greater ease in loading as fewer turns are required. Timbering would be simplified, drilling decreased, and cuts of coal more uniform in size in partial

Bad Roof Conditions Add to the Operating Cost of Pillar Recovery and Make Partial Extraction More Economical

By D. C. RIDENOUR

mining. Consequently, it is felt that an increased production per man of 21.8 percent could be expected. Converting to dollars per ton, the savings would be \$1.62 per ton on 87.2 percent of the total mine production or \$.141 per total mine ton.

Development: Since the face entry is such a relatively small proportion of the over-all production, it has not been considered. In full extraction, the room entry development constitutes 13.3 percent of the mine production. The estimated cost of driving room entries in excess of the cost

of the block mining is \$.179 per ton or \$.027 per total mine ton. It is expected that in partial extraction the entries would be developed by the production crew without any loss in tonnage and at no additional cost.

Tracklaying is the estimated cost to lay all of the track in the butt entry. In partial mining, the estimate is divided by the recoverable tons from two panels as rooms are turned off of both sides of the entry. The cost includes laying 40-lb rail on wooden ties the entire length of the butt entry, eight 200-ft dead end side track on steel ties, and eight switches.

Wirehanging is the estimated labor cost to hang the trolley and install bonds.

Ramp Construction. These are for shuttle loading into mine cars and are located on 122-ft intervals. The labor cost per ton is the estimated cost to shoot down top for height clearance, load out the dirt, and move the prefabricated ramps and set up hoist control and spray lines. In partial mining, it will be necessary to reset ramps as one-half of the rooms are driven on the advance and one half on retreat.

Timbering on the Entry is the estimated labor cost to set timbers on the face entry and to set 4- by 6-in. by 12-ft wooden crossbars on 9-ft centers in the butt entry. For full extraction the labor cost is divided by the recoverable tons in one panel; for partial extraction, by the tonnage from two panels.

Ventilation is the estimated labor cost to build four wet stoppings, an overcast, 28 dry block stoppings, 2 permanent doors and 32 temporary doors. For full extraction the cost is divided by the recoverable tons in one panel; for partial extraction, by the tonnage from two panels.

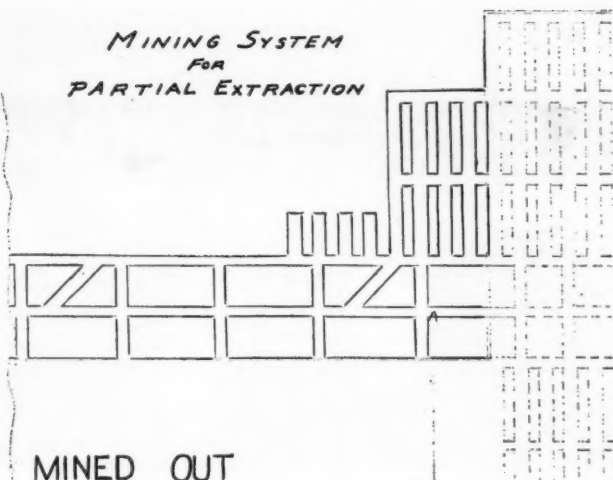
Airdox Lines is the estimated labor cost to install 3161 ft of 1-in. Airdox pipe. For full extraction the cost is divided by the recoverable tons in one panel; for partial extraction by the tonnage from two panels.

Drainage. It is not possible to estimate drainage costs. Therefore, a token savings of \$.001 per ton is in-

TABLE I
COMPARISON OF COST ITEMS AFFECTED BY CHANGING FROM FULL EXTRACTION TO PARTIAL MINING

Item	Dollars per ton, increase or decrease, with partial mining
Labor:	
Face cost.....	.141
Development cost....	.027
Tracklaying.....	.001
Wirehanging.....	.001
Ramp construction— credit.....	.007
Ventilation.....	.002
Timbering on entry....	.002
Airdox lines.....	.001
Drainage.....	.001
Supervision.....	.008
Maintenance.....	.001
Main haulage.....	.001
Cleaning plant.....	.001
Refuse disposal.....	.001
Vacation.....	.002
Social security.....	.003
Total labor.....	.186
Supplies:	
Track.....	0
Wire.....	0
Ventilation.....	.004
Entry timber.....	.001
Face timber.....	.041
Drainage.....	.002
Total supplies.....	.048
Power.....	0
Depreciation:	
Face equipment.....	.009
Items depreciated over the life of the property.....	.014
Total.....	.005
Total reduction in cost.....	.229

MINING SYSTEM FOR PARTIAL EXTRACTION



MINED OUT

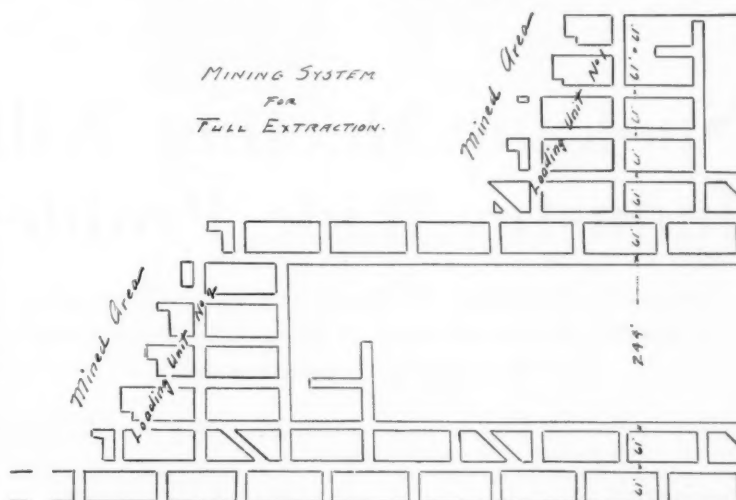
cluded simply to indicate that a saving should be realized, resulting from the decreased amount of water flowing into the mine due to the support of the overburden.

Supervision. One assistant mine foreman supervises the work of one shuttle car unit or two developing units. His salary is divided by the production of the crew he supervises to get the ton cost.

Maintenance. Since less slate will be handled per ton of coal in partial mining than in full extraction, it is expected that there would be less maintenance cost. The \$.001 per ton is included as an indication that some reduction in cost could be expected.

Main Haulage cost was calculated by using an average haulage cost reduced in direct proportion to the reduction in material handled.

MINING SYSTEM FOR FULL EXTRACTION



A spalling roof adds to pillar cost

Cleaning Plant. Same as Maintenance.

Refuse Disposal. Same as Maintenance.

Vacation. Using the expected saving in labor dollars to be realized by changing from full extraction to partial mining and converting to men per day by using average daily earnings, the savings in vacation cost was then calculated on the assumption that that number of men could be taken from the payroll; the over-all mine production remaining the same.

Social Security is calculated by taking 1.8 percent of reduction in cost.

Track Supplies are calculated by determining required track materials for one panel and their current cost, multiplying by the estimated percent of their life which would be expended in one butt entry and dividing the

resulting dollars by the recoverable tons for each type of extractions.

Power. Little change is expected in power consumption as a result of changing the method of extraction.

Depreciation of Face Equipment was calculated using the depreciation schedule and present prices of machines. The depreciation cost in dollars per day was divided by the expected daily production of a three-shift unit. The cost of depreciating developing unit equipment was taken into account percentagewise.

Items Depreciated Over Life of Property. The total investment in items that are depreciated over the life of the property was determined for a new mine. The tonnage allotted to that mine is 70,000,000 tons at 100 percent extraction. Using what were considered to be equally optimistic recovery figures of 85 percent for full extraction and 61 percent for partial mining, the recoverable tonnage would be 59,500,000 in one case and 42,700,000 in the other.



Around table from left to right: D. I. Hayes, S. P. Wimpfen, C. O. Dunlop, E. P. Houghland, J. J. Curzon, Rowland King, R. A. Young, L. E. Hanley, R. D. Leisk, Julian D. Conover, R. M. Hardy, W. J. Coulter, Stanly A. Easton, D. Carlson, J. B. Haffner, F. N. Marr, J. L. Leonard, Kuno Doerr, Jr., R. P. Porter, H. A. Sawin, D. A. Callahan, R. O. Oscarson, P. D. McMurrer, J. A. McCluskey, and P. E. Oscarson

Spokane Meeting Will Cover Industry-Wide Problems

Program Committee Contours Topics for Discussion at Inland Empire Meeting of Metal and Nonmetallic Mining Industry, September 26-28.

A WELL-ROUNDED meeting is assured the mining industry in Spokane, September 26-28, at the 1949 Convention sponsored by the Western Division of the American Mining Congress. Basic plans are taking shape to provide the 2000 mining men who will attend with the considered opinion and experiences of industry leaders on the various factors affecting mineral production. In addition to delegations from all mining areas in the United States, mining men from Canada are taking an active part in the program and a large number will attend the Convention.

Under the leadership of William J. Coulter, National Program Committee Chairman, and Stanly A. Easton, Chairman of the Western Division, State Chairmen from principal mining states and members of the various committees met on June 7 in Spokane in an all-day session to build a program of maximum interest. The many suggestions submitted by Program Committee members from all branches of the industry were given careful consideration, and a well-balanced schedule of subjects and speakers was drawn up with a view to giving the mining fraternity defi-

nite help in meeting present-day problems.

The general business outlook, prospects for the nonferrous metals, status of the strategic metals, a free market for gold, silver, labor-management relations, exploration and production incentives, stockpiling, tariffs, problems of the small mine operators, public land policies, industrial minerals, tax treatment of new mining ventures and producing mines, and discussion of how mines of the future will be found are among the subjects included in the comprehensive program. At the five general sessions open discussion and questions will add materially to the value and interest of the speakers' talks.

Papers by experienced production men will be presented in four operating sessions, balanced to give those who are responsible for getting "rock in the box" the foremost thought on up-to-date methods and equipment. Subjects scheduled include experience with the various types of single-pass bits, insert bits, inclined shaft sinking practice, Diesel power underground, roof bolting, underground dust problems, mine safety, ore reduction, milling operations, open-pit haulage problems, and churn drilling.

The Trips Committee, headed by Wray Farmin, has arranged two trips to the Coeur d'Alene mining district—one on Thursday, September 29, and one on Friday, September 30—that offer a splendid opportunity for firsthand inspection of interesting mining and milling installations of this important lead-zinc-silver producing area. A trip to Grand Coulee Dam is scheduled for Thursday, and on Friday there will be a trip to Metaline Falls. On Wednesday afternoon, visitors will have an opportunity to visit aluminum and ferrochrome plants in Spokane. Also for Thursday, tentative arrangements have been made for an airplane trip giving a complete "bird's-eye" view of the Coeur d'Alene district, Metaline Falls, Trail, and the Grand Coulee Dam area. A special trip to Chelan and Holden, to visit Howe Sound's copper-gold mine in the high Cascades, will also be available, and arrangements can be made for those wishing to inspect the great reduction works of the Consolidated Mining & Smelting Co. at Trail, British Columbia.

For the convenience of convention visitors arrangements are being made for advance registration—similar to the procedure which was so successfully carried out at the recent Coal Show in Cleveland—in order to avoid delays and standing in line at the registration desks. Advance registration cards will be mailed to all those whose names are available through the

Housing Bureau and to all others requesting them. Requests for advance registration may be made direct to the American Mining Congress.

Spokane's leading hotels have pledged a total of 1000 conveniently located rooms and a number of attractive motor courts will serve a large group planning to drive to the meeting. As a heavy attendance is expected, it is suggested that requests for reservations be mailed immediately to the Housing Committee, 1949 Metal Mining Convention, Davenport Hotel, Spokane. The Hotel Davenport, with its complete facilities, will be headquarters for the convention. Current plans call for holding all convention sessions in the hotel meeting rooms.

General arrangements for the convention are being tackled by hard working committees headed by R. M. Hardy, president, Sunshine Mining Co., together with Vice-Chairman Roger O. Oscarson, secretary, Northwest Mining Association.

James A. Ford, managing secretary, Spokane Chamber of Commerce, is cooperating in giving the best possible publicity to this first meeting of the American Mining Congress to be held in the Northwest in 20 years.

As Chairman of the Ladies' Committee, Mrs. R. P. Porter has planned some pleasant entertainment functions for the many ladies who will accompany their husbands on convention week.

On Monday noon, the Welcoming Luncheon with a nationally-known speaker will be held at the National



Stanley A. Easton
Chairman
Western Division



William J. Coulter
National Chairman
Program Committee



R. M. Hardy
Chairman



Roger Oscarson
Vice Chairman

General Arrangements Committee

Guard Armory. Spokane's Natatorium Park will be the scene of the Miners' Party on Monday night. A fried-chicken box lunch, augmented by hot beans, Idaho potatoes, and suitable liquid refreshments will fortify the funmakers for an entertaining evening. Dancing on the spacious

floor of the Natatorium ballroom and a professional performance will add to an evening that will be long remembered. Tuesday evening is left open for convention goers to join friends and see the sights of Spokane.

Rounding out convention activities, the Annual Banquet, top function of the mining year, will take place at the Davenport Hotel. There will be no speakers, but industry leaders will be called upon by the toastmaster to take a bow. Following a dinner of the fine food for which the Davenport Hotel is famous, specially selected entertainers will display their skill and modern and old-fashioned dancing will then be enjoyed in the Davenport's ballroom. In addition to the special entertainment features being planned for the ladies, they will be welcome to all convention functions.

Mining executives have a real opportunity at the 1949 Metal Mining Convention in Spokane to hear analyses of the varied management problems which affect the industry. Declining metal prices, all out of balance with high wage and material costs, give added importance to the cost-saving methods and practices that will be open for discussion at the operating sessions. The opportunity to meet mining men of the principal mining areas of the United States and to discuss with them ideas and experiences will be of special value at this time. Mine production staffs, those men responsible for the monthly tonnage-cost figures, will particularly benefit from the program.

Complete your plans now to attend this big event of the mining year.

State Chairmen

Alaska

J. A. WILLIAMS
Alaska Juneau Gold Mining Co.

Arizona

P. D. I. HONEYMAN
Inspiration Consolidated Copper Co.

California

H. A. SAWIN
Yuba Consolidated Gold Fields

Colorado

C. J. ABRAMS
Climax Molybdenum Co.

Idaho

J. B. HAFNER
Bunker Hill & Sullivan Mining & Concentrating Co.

Montana

KUNO DOERR
American Smelting & Refining Co.

Nevada

S. S. ARENTZ
Combined Metals Reduction Co.

New Mexico

G. F. COOPE
Potash Co. of America

Oregon

FAY I. BRISTOL
Bristol Silica Co.

South Dakota

N. P. GOODRICH
Bald Mountain Mining Co.

Texas

RICHARD A. YOUNG
American Zinc Co. of Illinois

Utah

LOUIS BUCHMAN
Utah Copper Division,
Kennecott Copper Corp.

Washington

JOHN J. CURZON
Chelan Division
Howe Sound Co.

Tri-State & Mississippi Valley

ELMER ISERN
Eagle-Picher Mining & Smelting Co.

Lake Superior

PERRY G. HARRISON
Hanna Iron Ore Co.

Eastern

GLOYD M. WILES
National Lead Co.

Manufacturers

J. H. FULFORD
Jeffrey Manufacturing Co.



WHEELS OF GOVERNMENT

As Viewed by A. W. DICKINSON of the American Mining Congress

THE present speed-up on the part of both the Senate and House indicates a determination to wind up the first session of the 81st Congress early in August. Since July 4 both Houses have been inconvenienced by working in cramped quarters while long needed repairs are being made to their respective chambers in the Capitol building. The House is meeting in its Ways and Means Committee room in the new House Office Building and the Senate in the old Supreme Court room in the Capitol.

Senator Byrd of Virginia has voiced concern over the \$1,800,000,000 Treasury deficit as of midnight June 30. He predicted greater deficits for 1950 and 1951, because of the anticipated decline in tax revenues and called upon Congress for a drastic reduction in spending.

Senate Finance Committee Chairman George of Georgia is also outspoken in his opposition to any present tax increase. The Senator emphasizes that "the greatest service that the President could render would be a clear, positive, definite statement that at this time it would be unwise to increase tax rates."

Labor Bill

Following a Senate floor battle from June 6 to June 30, the Taft-Smith-Donnell triumvirate, aided by many Southern votes, succeeded in replacing the Administration bill, which would have repealed the Taft-Hartley Act and reenacted the Wagner Act, with the compromise measure reported in our June issue. As in the House battle, which ended with recommitment of the labor bill, the Senate Administration forces tried to make their measure more palatable by adding amendments which included bargaining in good faith, freedom of speech, filing of financial statements, and non-Communist affidavits. This effort was, however, of no avail,

and the Taft amendments were adopted, although the vote margins were close.

The bill has now been sent over to the House, where there is little likelihood that Administration forces can clear any kind of labor bill through the Committee on Education and Labor in the remaining days of the current session.

Wage-Hour

On June 24 the Senate Labor Committee reported a bill which would increase the minimum wage from 40¢ to 75¢ an hour, permit the Government to sue employers for back wages on behalf of employees, strengthen child labor provisions of the Fair Labor Standards Act, extend the coverage of the Act to include non-farm workers engaged in processing agricultural products, and apply the Act to retail stores engaged for the greater part in interstate commerce.

Previously, in a tie vote on June 15, the House Labor Committee turned down a simple measure raising the minimum wage from 40¢ to 75¢ an hour. Still pending before the Rules Committee is the Administration bill increasing the minimum to 75¢ an hour and greatly expanding the coverage of the Act. House Labor Committee Chairman Lesinski (Dem., Mich.) has stated that he does not now plan further action on this latter measure.

Overtime-on-Overtime

Early House action is anticipated on the Overtime-on-Overtime Bill, HR 858, which will send the measure to the White House. The House is now expected to concur in the Senate amendments which make the provisions of the bill apply to all industries retroactively. The measure excludes from the regular rate of pay, for purposes of overtime compensation, premiums paid for Saturday, Sunday and

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Washington Highlights

CONGRESS: August adjournment likely

LABOR BILL: Senate passes Taft version

WAGE-HOUR: Bill reported to Senate

OVERTIME-ON-OVERTIME: May go to White House

BASING POINT: Set for House passage

METALS DUTIES: Restoration asked for copper

INCENTIVE PAYMENTS: O'Mahoney bill active

MINING CONTRACT CLAIMS: On President's desk

ASSESSMENT WORK: Another moratorium

MINE INSPECTION: Police powers sought

COAL NEGOTIATIONS: Three-day week ordered by Lewis

★ ★ ★ ★ ★ ★ ★ ★

holiday work, and for work at undesirable hours.

Senator Donnell (Rep., Mo.) in discussing the retroactive feature of the bill stated: "We believe that the overtime-on-overtime claims cannot be distinguished from the claims covered by the Portal-to-Portal Act. In both cases the claims arose under the Fair Labor Standards Act and would not have existed were it not for that law; in both cases, the claims arose by reason of the failure of Congress to define a basic term in that Act—the 'workweek' in the portal-to-portal situation and 'regular rate' in this overtime-on-overtime situation; in both cases, prosecution of the claims violated the spirit of collective-bargaining agreements; in both cases, the filing of suits was deplored by responsible A. F. of L. officials; in both cases, the collection of claims would unfairly penalize employers who attempted in good faith to comply with the wages-and-hours law. Indeed, in

every important respect the overtime-on-overtime claims closely parallel the portal-to-portal claims. In our opinion, the factual and legal findings recited in the Portal-to-Portal Act are equally applicable here, and the situation requires the same expeditious and equitable treatment by Congress."

Basing Point

The House has now passed the Senate Basing Point Bill, S 1008, and the measure goes back to conference for consideration of House amendments intended to protect small business. The purpose of the bill is to clarify the position of business in the face of recent Supreme Court rulings that systematic freight absorption in delivered prices violates the anti-trust laws. The bill permits manufacturers to quote identical delivered prices from a base pricing point to different delivery points, if there is no collusion to fix prices and destroy competition.

Metal Import Duties

Early in June numerous bills were introduced in the House and Senate to repeal the measure passed last March, which suspended the import tax on copper until June 30, 1950. Sponsors of the bill have cited the shutting down of numerous copper operations, including mines in Michigan, Montana and Arizona, as reasons for the desired repeal.

Introducing bills for restoration of the import tax were Senators McFarland and Hayden (Dems., Ariz.), McCarran (Dem., Nev.), Thomas (Dem., Utah), Murray (Dem., Mont.), Ferguson (Rep., Mich.), Watkins (Rep., Utah), Chavez and Anderson (Dems., N. M.), Malone (Rep., Nev.), Aiken (Rep., Vt.), Johnson (Dem., Colo.), and Reps. Bennett (Rep., Mich.), Baring (Dem., Nev.), Patten (Dem., Ariz.), Murdock (Dem., Ariz.) and Mansfield (Dem., Mont.).

The suspension of the import duty on lead, amounting to one and one-sixteenth cents per pound, expired June 30, no further action having been taken on the Mills (Dem., Ark.) bill which would have extended this suspension for another year. The trade agreement with Mexico which became effective in January, 1943, provides that effective 30 days after the termination of the unlimited national emergency the rate shall be one and seven-tenths cents per pound. There has been no further action on the VanZandt (Rep., Pa.) bill to suspend the import duty on zinc.

Meanwhile the long awaited Senate debate on extension of the Foreign Trade Agreements Authority is scheduled to follow consideration of the North Atlantic pact, now under way on the Senate floor.

Incentive Payments

The Engle (Dem., Calif.) Mine Incentive Payments bill, HR 976, discussed in the May and June issues, is still before the House Committee on Rules, following hearings before that committee at which members of the House and Senate urged passage of the legislation.

On June 17, Senator O'Mahoney (Dem., Wyo.), Chairman of the Senate Committee on Interior and Insular Affairs, introduced S 2105, which would create a "Minerals Conservation Board" with authority to prescribe financial aid to promote eligible exploration and eligible production for metals and minerals. The Board would include the Secretaries of Interior, Defense, Commerce and Treasury, with the Secretary of the Interior as Executive Chairman. The Board is authorized to determine: (1) the amount of appropriated money to be allocated to promote eligible exploration and to promote eligible production; (2) the amount of money to be allocated to the promotion of eligible exploration and eligible production for any specified metal or mineral or groups of metals or minerals; (3) the maximum or minimum price, or both, which may be paid for any such metal or mineral; (4) the maximum or minimum amount, or both, which may be paid to any producer or class of producers on account of eligible exploration and the ratio which the Government's contribution shall bear to the contribution of such producers; (5) the particular metals, minerals or ores, and specifications therefor that would be eligible for production payments, and those that would be eligible for exploration payments; and (6) terms of contracts with producers.

It is understood that Sen. O'Mahoney plans to add a provision to his bill under which the metals, minerals or ores contracted for by the Government will be transferred to the defense stockpile.

The bill defines "eligible exploration" as "exploration in the United States for unknown or undeveloped sources of essential or strategic or critical metals or minerals, conducted from the surface or underground, by surface trenching, core or churn drilling, tunnels, raises, winzes, or shafts, including recognized and sound procedures for obtaining pertinent geological information, and including metallurgical research on processes for the production of such metals or minerals."

"Eligible production" is defined as "the production of essential or strategic or critical metals or minerals, or ores of such metals or minerals, from mines in the United States or from tailings, dumps, slags, or residues of such mines, which the Board deter-

mines would be discontinued, or remain discontinued, resulting in the probable permanent loss of an important resource in the absence of financial aid by the United States to keep in operation the particular property from which such production comes."

It is expected that Sen. O'Mahoney will conduct hearings on his bill in the near future.

Mining Contract Claims

Now at the White House awaiting approval is a bill by Rep. Engle which amends the Contract Settlement Act of 1944 for the purpose of compensating persons who, without fault or negligence, suffered losses in attempting to supply certain strategic or critical minerals or metals for the war effort. The bill specifies that a published, posted, or oral offer by any contracting agency to purchase any strategic or critical mineral or metal, shall be deemed to be a request to proceed from such contracting agency. Any reimbursement to be received is limited to amounts expended between September 16, 1940, and August 14, 1945. In sending the bill to the President, the House approved an amendment placed in the bill by Sen. Ed Johnson (Dem., Colo.) restricting the amount which may be paid to agents or attorneys to not over ten per cent of the total compensation received.

Sen. Pat McCarran (Dem., Nev.) in the course of debate on the Senate floor asserted, "There is no doubt in the minds of the Committee that most, if not all, of those who would benefit by this bill were induced to engage in the activities resulting in their present losses because of official representations of authorized Government agents."

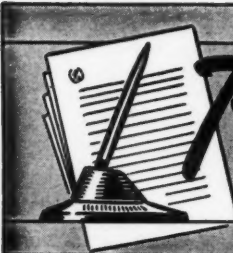
Assessment Work

Two bills affecting assessment work on mining claims have recently been approved by the President. The Granger (Dem., Utah) bill, HR 1754 (Public Law 107), approved June 17, extends the moratorium on annual assessment work for the fiscal year ending July 1, 1949. The claim holder is given until noon, August 1, 1949, to file a notice of his desire to hold his claim in the office where the location notice or certificate is recorded.

The new law also provides, "That any labor performed or improvements made on any such mining claims during the year ending July 1, 1949, may be credited against the labor or improvements required to be performed or made for the year ending at 12 o'clock meridian on the first day of July, 1950."

The President's action in approving the bill came as a distinct surprise, and he stated that while he reluctantly gave his approval he believes that any further extension of the suspen-

(Concluded on page 58)



Personals

At a meeting of the board of directors of the Island Creek Coal Co. and Pond Creek Pocahontas Co. in Boston, Mass., June 13-14, Raymond E. Salvati was elected to the presidency of the two companies. H. A. Glover was elected to the position of president of Island Creek Coal Sales Co., and re-elected vice-president



R. E. Salvati

in charge of sales for both operating companies. Albert L. Lynn was also elected a vice-president of both companies. James D. Francis was elected chairman of the board of directors of both companies after holding the post of president for the past 15 years.

J. H. Pascoe of Bellingham, Wash., has been elected chairman of the Washington State Mining Board at the first meeting of that body in June at Olympia. Thomas Walmsley is board representative for practical miners, and Harry Boyle is engineers' representative.

On June 1, F. S. Mulock, vice-president and general manager of western operations, United States Smelting Refining and Mining Co., announced that T. P. (Josh) Billings, manager of western mines, became consulting mining engineer for the company. Arch G. Kirkland, assistant manager of mines since January 1949, succeeds Mr. Billings.

Charles W. Stickler, Jr., has resigned as associate professor in charge of research related to mechanical mining, for Pennsylvania State College, to join the firm of Robinson and Robinson, Mining Engineers, of Charleston, W. Va. Mr. Stickler's headquarters are at Reading, Pa.

J. A. Doyle, supervising engineer, Erie Mining Co., Mesabi iron range, retired on May 1.

S. J. Craighead, vice-president and general manager, United States Fuel Co., was elected president of the Utah Coal Operators Association for the 1949-50 year. He succeeds A. P. Cederlof, general manager, Fearless Coal, Inc. L. R. Weber, president, Liberty Fuel Co., was elected association vice-president, and B. P. Manley was elected executive secretary.

E. B. Bransome has resigned as president and chief executive of the Vanadium Corp. of America. He will become chairman of the board and president of Mack Trucks, Inc., while retaining his position on the board of directors and executive committee of the Vanadium Corp. of America. William C. Keeley, director of the corporation since 1936, was elected president and chief executive of the corporation.

J. B. Warriner, chairman of the board of the Lehigh Navigation Coal Co., Inc., has announced his desire to relinquish executive authority by the end of 1949 and to transfer all such functions to Evan Evans, president of the company.

R. S. Cockle, former night foreman of the Idarado Mining Co., Ouray, Colo., has been made mine superintendent succeeding George W. Murray, who has taken a position with the Lepanto Consolidated Mining Co., Mankayan, Mountain Province, P. I.

A. J. Christiansen has succeeded the late James W. Bristow as secretary-treasurer of the Illinois Coal Strippers Assn., Chicago, Ill.

William Lessard, safety inspector for the Inter-State Iron Co., on the Mesabi range, has been appointed general mine foreman of the firm's Grant mine at Buhl, Minn. LeRoy E. Nelson succeeds Mr. Lessard as safety director.

Dr. M. G. Sturrock, Canadian expert in coal tar research, was recently named manager of development for the Tar Products Division of Kopfer Co., Inc.

Ward M. Canaday of Willys-Overland Motors, Inc., has been appointed advisor to the chairman of the Muni-

tions Board on matters pertaining primarily to the industrial planning program of the board.

Howard E. Wetzel has been appointed mining engineer of the mining branch, conservation division, U. S. Geological Survey. Mr. Wetzel will assist with the supervision of mining operations on leased government land in the Salt Lake City district.

Kiril Spiroff, formerly superintendent of the Isle Royale Copper Co., is now on the staff of Michigan College of Mining and Technology, teaching geology and mineralogy.

Officers elected at the annual meeting of the Consolidated Coal Co. were: W. J. Jenkins, president; G. S. Jenkins, vice-president and general manager; Josiah Whitnel, vice-president and general counsel; A. W. Carr, secretary and treasurer; and M. J. Devaney, auditor.

James W. Wade, president, general manager, and director of Tintic Standard Mining Co., resigned on



James W. Wade

June 14 after 30 years of association with the firm. He is succeeded by Harold E. Radatz. Roy M. Jacobs, a director, was elected vice-president; M. D. Paine, former treasurer, was reelected to that post and also named general manager, and Cora V. Thompson was reelected secretary.

In a recent announcement by Stuyvesant Peabody, Jr., president, Peabody Coal Co., George W. Reed, vice-president, and 11 other officers and employees of Peabody Coal Co., were retired under a program adopted last year. Frank L. White was promoted from mining engineer to assistant vice-president of the company; H. Dodge Freeman, from assistant chief engineer to mining engineer; and George T. Ember, from engineer to assistant chief engineer.

Stewart Carpenter, chief engineer of the Douglas smelter, Phelps Dodge Corp., Douglas, Ariz., has been temporarily assigned to the corporation's smelter at Clarkdale.

Karl M. Marquis has been named chairman of the board of Warner Collieries Co. Whitney Warner, Jr., continues as president.

—Obituaries—

J. C. Kinnear, vice-president, Kennecott Copper Corp., was awarded an honorary doctor of laws degree by the University of Nevada. Mr. Kinnear delivered the main address at commencement exercises. In the course of his presentation he stated, "The golden key to increased productivity and a resultant higher standard of living may well lie in the greater use of ourselves as people."

R. L. Ireland, president, Hanna Coal Co., has been reelected president of the Ohio Coal Association. Other officers reelected at the annual meeting of the association were **Ezra Van Horn**, executive vice-president; **E. H. Miller**, secretary and treasurer; **F. H. Boecker**, assistant secretary and assistant treasurer.

William Langdon of Calumet, Mich., was recently appointed captain of the Kearsarge copper mine of the Calumet & Hecla Consolidated Copper Co.

Dr. Louis C. McCabe, former coal branch chief in the U. S. Bureau of Mines and for the last two years director of the Los Angeles air pollution control district, rejoined the Bureau on July 5, as chief of air and stream pollution prevention research in the Bureau. Dr. McCabe will also serve as assistant chief of the fuels and explosives division under Dr. A. C. Fieldner.

Robert Chisholm is now in charge of scrambling operations at the Chataco mine, of Pacific Isle Mining Co., Chisholm, Minn.

Thomas J. Thomas, president of the Burlington-owned Valier Coal Co., has resigned his duties after many years of service. **J. F. McAlpine** succeeds Mr. Thomas as president of the Valier Coal Co. and will continue his duties as assistant general purchasing agent of the Chicago, Burlington & Quincy Railroad.

C. J. Parkinson, Salt Lake City, has been named vice-president and director of Dragon Consolidated Mining Co., an affiliate of North Lily Mining Co., and Anaconda Copper Mining Co.

J. S. Besser, Colorado Fuel & Iron Corp., has been elected president of the Colorado and New Mexico Coal Operators Association at the annual meeting. Other officers named were **G. R. Harris**, Hayden Coal Co., vice-president; **J. R. Kastler**, St. Louis, Rocky Mountain & Pacific Co., second vice-president; and **O. F. Bridwell**, secretary-treasurer.

Raymond L. Larson has been elected treasurer of Oliver Iron Mining Co. and **Arthur L. Anderson** has been elected assistant treasurer.

E. J. Newbaker, 75, vice-president and general manager of the Berwind-White Coal Mining Co., died on June 10 of a heart attack. Mr. Newbaker was long prominent in the coal industry as an aggressive promoter and advocate of the utilization of modern mining methods. He was chairman of the Coal Division of the American Mining Congress from 1934 to 1938.



James MacNaughton, 85, former president of the Calumet & Hecla Consolidated Copper Co., died May 26 in Calumet, Mich. Mr. MacNaughton was president of Calumet & Hecla from 1926 to 1941. For 40 years Mr. MacNaughton has been a dominant figure in the copper mining world.

His first prominent association with the mining industry was in 1901 when he became superintendent of Calumet & Hecla when he took over these duties at the request of Alexander Agassiz. He guided the destinies of the company from a small beginning to an expansion program that included the absorption of a number of old and new properties in the copper country.

Although a busy man, Mr. MacNaughton devoted attention to matters of public welfare. He was delegate to several Republican National Conventions, a member of the Board of Control of the Michigan College of Mining and Technology, and he served as a director of several companies. In 1935 he was the recipient of the William Lawrence Saunders medal of the AIME for outstanding achievement in the field of high-cost mining.

James Winfield Crosby, 74, died in San Francisco in March. He was once secretary of Bunker Hill and Sullivan Mining and Concentrating Co. and of Alaska Juneau Gold Mining Co.

Dr. William Clifton Phalen, 72, salt expert and consulting engineer geologist with the U. S. Bureau of Mines, died in May at his home in Washington, D. C., after a long illness. From 1902 to 1904, Dr. Phalen was connected with the National Museum. He then transferred to the U. S. Geological Survey and became interested in the field of salt deposits. From 1916 to 1920 he was a mineral technologist with the Bureau of Mines. He went to

Syracuse, N.Y., in 1920 as a salt geologist for the Solvay Process Co., and remained there until he retired in 1946. From then until the time of his death he was a consultant for the U. S. Bureau of Mines.

Hubert Merryweather, 67, retired general manager of ore properties for Bethlehem Steel Co., died on June 7 at his home in Bethlehem, Pa.

Mr. Merryweather had been with Bethlehem Steel Co.'s raw materials department for 36 years, holding various managerial positions for Bethlehem at ore properties in Cuba and Chile as well as at Bethlehem, Pa. In 1928 he was appointed mining engineer with offices at Bethlehem, and in 1939 he was made general manager of ore properties.

George F. Campbell, 61, president of the Illinois Coal Operators Association and of the Old Ben Coal Corp., died June 18 at Evanston, Ill., after a long illness. Mr. Campbell was one of the prominent bituminous coal operators in the country and for many years had been a leader in representing Illinois coal producers in contract negotiations with the United Mine Workers.

Mr. Campbell had spent his entire business life with the Old Ben Coal Corp. Beginning with the company as an engineer he rose to general manager and vice-president and was elected president in May 1948. He was a pioneer in coal mine mechanization and his company was among the first to install and operate mechanical loaders more than 25 years ago. He was chairman of the Program Committee of the Coal Division of the American Mining Congress in 1943.

Percy E. Wright, consulting engineer of Hillsboro, N. M., died at Hillsboro early in May. He was engaged in the development of the Empire mine at the time of his death.

A. C. Nebeker, 67, field engineer for the Arizona Department of Mineral Resources, died at a Prescott, Ariz., hospital on May 20 following a heart attack. During the war, Nebeker was regional adviser for the Mining Division, War Production Board, and prior to that had operated extensively in Utah, Nevada, New Mexico, Arizona, and the Philippine Islands.



Structure Drilling Wash Ore

(Continued from page 47)

though some of it is merchantable, the greater part is waste, since the fine-grained slate cannot be washed successfully. Standard wash ore is ore that can be concentrated to an acceptable grade with a corresponding high weight recovery. Lean wash ore can be either standard wash ore with a low recovery or wash ore whose concentrates are higher in silica than the standard wash. Retreat ores would include any low-grade ores that could be benefited economically by any process.

These classifications are placed on the sections and grading lines connecting like materials are then drawn in. Drill holes which show sufficient ore to pay for the removal of surface and waste ore material overburden, are indicated on the surface map of the drilling area and an outline is drawn connecting such holes to show the stripping limits. This outline is then plotted on the sections. With the above data, estimates can be made on the tonnages of ore which will be available by the removal of known yardages of surface and taconite.

In the final recapitulation, estimates of tonnages and analysis, for long-range planning of development and operation are based upon drill holes analysis and classification. These estimates are only as reliable as the samples themselves. It, therefore, is imperative to use the best methods available in obtaining these samples. There has been little change or improvement over the years in the drilling methods used with the exception of "structure drilling" as against straight churn drilling. At present the best equipment available for drilling wash ores consists of a structure drill outfit with an auxiliary diamond rig for drilling hard layers.

That structure drilling is far from perfect is demonstrated by mill results from areas that have been drilled. Generally, although not always, the drill sample results are optimistic, in that mill returns are lower in iron and higher in silica than would be indicated by drill analysis. No uniform factor is known that can be applied to structure drill analysis, although some companies have adopted corrective factors for certain ore bodies.

Some experimentation has been done in an effort to obtain better samples. In one case a bank was sampled by hand. Five feet back of this bank a structure drill hole was put down using 2-in. rods and 3-in. casing to a depth of 25 ft. Another 5 ft farther back a structure drill hole, using 3-in. rods and 4½-in. casing was also put

down to 25 ft. The cumulative results were studied to see if the larger size drill hole showed any advantage over the smaller drill hole, both in sample structure and analysis. The analysis of the larger hole was the closer to the analysis of the bank sample which indicated more concentration in the smaller hole. However, the cost of drilling the large hole was approximately double the cost of drilling the smaller one, although it is felt that the improved sample obtained from the larger drill hole compensates for the additional cost.

Diamond drilling of wash ore, using a double-type core barrel, with various types of core lifters was moderately successful in recovering core, but loss of fines in such drilling still presents an obstacle that has yet to be overcome.

Wash ore drilling will no doubt be a problem for years to come. Even with perfect sample recovery, if such

could be obtained, the engineer could only approximate what such material will do in the plant. Such approximation, however, would be closer and more consistent with actual results, if better samples could be made available. In the future, drilling contractors should strive to develop their methods to improve the samples obtained. Engineers should persevere in their study and classification of these samples, aided by all means at their command, so that the final results will be more authentic with resulting benefit to the entire industry.

The writer wishes to extend his thanks to the Inter-State Iron Co. and to A. N. Wold, mining engineer, for the cut which shows a churn drill remodeled for use in structure drilling. Assistance is also acknowledged from other mining engineers and structure drillers and to D. H. Hill, exploration engineer, for the Oliver Iron Mining Co. in the Canisteo District.

Wheels of Government

(Continued from page 55)

sion of the assessment work requirement would be detrimental to the public interest.

A second bill, HR 3754, approved June 21 (Public Law 115) authorizes deferment of assessment work on mining claims in the United States when the right of way by which the holder may gain access to the claim is the subject of litigation or in process of acquisition.

Both of the above laws provide that any person who prospects for, mines, or removes, by strip or open-pit mining methods, any minerals from any land included in a stock raising or other homestead entry or patent, shall be liable for any damage that may be caused to the value of the land for grazing.

Coal Mine Inspection

Two days of hearings were concluded June 17 by a House Labor subcommittee on HR 3023, by Rep. Price (Dem., Ill.), which would authorize

U. S. Bureau of Mines coal mine inspectors to withdraw men from mines upon detection of imminent hazard. This is a companion measure to the Neely (Dem., W. Va.) bill S 1031 discussed in the June issue.

Vigorous opposition to the granting of police powers to Federal mine inspectors was again expressed by representatives of State mining departments and by representatives of a number of mining associations.

Coal Negotiations

Contract negotiations between northern and western coal operators and UMWA representatives, which began at White Sulphur Springs, W. Va., on June 22, are now in recess until July 26. Concurrently negotiations have been under way between the UMWA and U. S. Steel, and by UMWA representatives at Bluefield, W. Va., with the Southern Coal Producers Association. Contract discussions in the anthracite industry begin in Philadelphia July 7.

Meanwhile from June 13 to June 20 the miners stayed away from the mines for what John Lewis termed "a brief stabilizing period of inaction." Thereafter the mines operated for one week until the mine workers began their ten-day annual holiday on June 24. Lewis ordered his men to return to the mines July 5 and to thereafter work but three days in each week as a means of an equal sharing of the work throughout the industry. The operators' representatives at White Sulphur Springs did not go along with Lewis' three-day week proposal—they rejected it, taking the position that their contract with the UMWA runs until August 14, under the 60-day termination clause in the Taft-Hartley law.

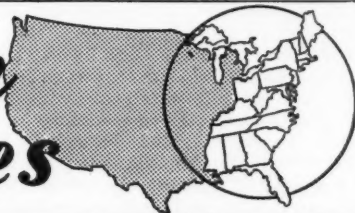


NEWS

and VIEWS



Eastern States



Mineral Producers Meet

On June 24 the Mineral Producers Association of Kittanning, Pa., held a highly successful and well-attended annual meeting at the William Penn Hotel in Pittsburgh, Pa. At the business meeting in the forenoon, the following officers were reelected: R. R. Bowie, president; R. S. Walker, vice-president; and R. T. Laing, secretary and treasurer. At the afternoon meeting a paper was presented by M. A. Crawford, the association's general counsel, analyzing laws passed at the 1949 Pennsylvania legislature. John Griffin, McNally-Pittsburg Mfg. Co., spoke on the preparation of strip mined coal; George A. Lamb, manager of business surveys, Pittsburgh Consolidation Coal Co., addressed the group optimistically on the long-range future of coal. Dan E. Dunmire, State forester of Clarion, Pa., told of the excellent results achieved in planting and land use in strip mined areas.

At the annual banquet, the climax of the day-long session, John D. Battle, executive vice-president, National Coal Association, was the guest speaker. Talking before 400 strip coal mine operators, legislators, and executives, he said, "Speaking as a citizen, I am more concerned at this time with this trend toward a centralized government than I am with some of the details surrounding the coal industry itself." Mr. Battle pointed out that the coal mining industry had reached a high state of perfection in the fields of production, preparation, and sale but has not been able to convince a

great segment of the citizenship of the superiority of the free enterprise system.

At the banquet, R. R. Bowie, president, Bowie Coal Co., and president of the association, gave a short address of welcome and introduced the toastmaster, Charles B. Baton, president, Greensburg-Connellsville Coal & Coke Co.

Republic Curtails Operations

Fifty workers have been laid off at the Republic Steel Corp. iron mines at Lyon Mountain, N.Y., and in Mineville and the work week has been reduced to four days. The action was due to a decrease in demand for ore, according to officials.

Coal Unloader Construction

A river barge unloading terminal and other coal handling facilities will be built at the Frank R. Phillips power station of the Duquesne Light Co., at Weirton, Pa., by the Dravo Corp. A large unloader designed to handle five tons of coal an hour was started in June for completion by December 1, 1949. Coal will be transported to the new facility by barge from mines along the Monongahela River above Pittsburgh.

In operation the bucket will scoop coal from the barge and dump it into a concrete hopper in the base of a tower. Then a 48-in. conveyor belt will take the coal to the crushing plant. From there the coal can be

diverted to the storage pile or moved directly to the power station bunker. A stacker with a 57-ft. boom will carry a 36-in. wide conveyor belt to distribute the coal on the storage pile and stack it. Facilities will be available for storing some 245,000 tons of coal.

Continuous Miner in Alabama

Tennessee Coal, Iron & Railroad Co., on the strength of results obtained from its first Joy continuous miner, is purchasing a second unit.

Some difficulty was encountered in preliminary experimentation at the Concord mine while mining the full thickness of the seam including the thick "middle man." This hard parting caused much wear and tear on the teeth and several types of cutting bits were tried. By mining above the "middle man" the machine operated satisfactorily.

Pollution Bill Might Close Mines

Two members of the Alabama legislature are proposing a bill to stop pollution of streams. This would involve many industries in Alabama including coal operators.

The coal industry plans to wage an all-out fight to kill the measure. Officers of the Alabama Mining Institute contend that such a bill would close 17 mines in the Birmingham district.

Fourth Empire Mining Congress

Twenty-seven countries sent representatives to the Fourth Empire Mining and Metallurgical Congress held in Great Britain from July 9 to 23. The technical programs considered the progress of problems relating to mining and metallurgical industries, including the development of the mineral resources of the Commonwealth. Forty papers were presented and discussed on the various sections of the program.

Tinplate Film

A 27-minute sound film in color has been sponsored by the Weirton Steel Co., Weirton, W. Va. in cooperation with the U. S. Bureau of Mines and produced by the Atlas Film Corp. It depicts the step-by-step making of tinplate from the raw materials to the finished products. Scenes show the slow, laborious hand methods by which tinplate was made in Europe several hundred years ago and contrasts these with the dramatic views of the great plants, blast furnaces, and materials required to supply today's needs. Views of the Weirton plants and mills show the conversion of iron ore, coke, scrap, and limestone into molten metal, bars of steel, and then into coils of thin sheet steel. The various types of equipment and treatments required to squeeze steel bars into thin, mile-long strips are depicted in natural color. The film is available for distribution to schools, colleges, and other organizations through the Film Library of the U. S. Bureau of Mines at Pittsburgh, Pa.

Ohio Mine to Rebuild

Work has begun on rebuilding the Sunday Creek Coal Co. Mine No. 9 tippie, operated by the Rend Mar Coal Co. The tippie was destroyed in a \$75,000 fire on April 30.

Wylam Mine Closes

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., ceased mining operations about June 24, at its Wylam coal mine, a short distance north of the Fairfield coke works. The move will not affect the company's coal production volume, A. V. Wiebel, vice-president, operations, explained, since the company has realized for several years it was nearing the limits of recoverable coal from the mine.

To replace production from the Wylam mine, the company opened the new Concord mine, now in production and with a greater capacity. The Wylam mine went into production in 1891. The company estimates it has recovered more than 25,000,000 tons from the mine.

Southeastern Mining Association

At a meeting held in Columbia, S.C., June 10, the Southeastern Mining Association was formed to promote the best interests of mineral producers in the states of that region. Officers of the new association are: president, W. Lunsford Long, Tungsten Mining Corp.; first vice-president, W. H. Swanson, Monetta Clay Co., Columbia, S.C.; second vice-president, Marvel Lynch, Calhoun Mines, Inc., Dahlonega, Ga.; secretary-treasurer,

Dr. Lawrence L. Smith, State Geologist of South Carolina, Columbia, S.C.

Members of the executive committee are: F. D. Bowen, International Minerals & Chemicals Corp., Columbia, Tenn.; E. C. Weichel, Jr., Davison Chemical Corp., Bartow, Fla.; C. B. Arrington, an iron ore producer of Cedartown, Ga.; R. S. Campbell, Jr., Campbell Limestone Co., Gaffney, S. C.; Clyde E. Smith, feldspar operator, Lowry, Va.; Dr. Sterling J. Foster, Alabama Flake Graphite Co., Birmingham, Ala.; George M. Brown, Tungsten Mining Corp., Henderson, N. C.; and W. B. Isaacs, Central Rock Co., Lexington, Ky.

Blending Coal

A technical study of bituminous coal from West Virginia's Beckley bed has been conducted by the U. S. Bureau of Mines. Results of tests show that this coal can be used satisfactorily as a blending coal in making metallurgical coke. Reserves of the Beckley coal bed, largely low-volatile bituminous, are estimated at more than two billion tons. The report pointed out that the Beckley coals can be used to augment better-known Pocahontas blending coals as reserves of the Pocahontas coals become depleted.

European Coal Needs

The Marshall Plan countries now have sufficient coal for all essential needs derived from their domestic production plus imports of coal from the U. S. Prior to 1948, needs of participating countries were not being met although they were importing as much coal as the U. S. could supply.

In a recent report, the ECA stated that since the beginning of 1948, as production of coal in Europe increased, requirements for U. S. coal declined. Improved efficiency and economy of production and distribution to increase European supplies are goals set up to provide the required quantities of coal from European sources.

As a result of increased production, requirements for imports of American coal in 1948 dropped to less than 50 per cent of the 1947 volume. Requirements for U. S. coal are expected to drop from \$152,000,000 during the last fiscal year to \$99,000,000 in the year beginning July 1.

River Plant Closed

Pittsburgh Consolidation Coal Co., has suspended operations at its river-rail terminal and coal-washing plant on the Ohio river, East Liverpool, Ohio.

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Direct Reduction of Iron Ore

Using a hydrogen atmosphere, samples of steel have been made by the direct reduction of iron ore. Pluro, Inc., utilized the process, developed by Rene Planiol, in a \$200,000 pilot plant designed to conduct extensive tests.

Benjamin R. Fayn, secretary and treasurer of the New York City corporation, states that the method will enable steel to be manufactured in geographic locations which do not have the limestone and coal necessary for blast furnace processes.

In the pilot plant operation, finely powdered ore is blown with nitrogen gas into a graphite-lined, electric, hydrogen-atmosphere furnace and in less than a minute is transformed into liquid ferrous metals. The pilot plant setup produces 3-oz. ingots.

In developing the process, research obstacles which had to be overcome included finding methods for obtaining a low-cost finely ground powder, another method for magnetic separation of iron ore from impurities, and a procedure for getting the proper flow of the powdered ore into the electric furnace.

Developers claim that alloy steels may eventually be made by mixing iron ore and alloying metal ore in powder form before introduction into the electric furnace. It is also probable, according to the developers, that, if the process succeeds commercially, larger plants for ore preparation may be built at mine locations. Mines would then ship only concentrated powdered ores.

Officials of the company state that, in advance of installation of complete commercial steel-making plants, installations of ore crushing and ore separation machines will be made. Preparation machines are reported to crush bauxite, zinc ore, or any kind of similar material, including coal.

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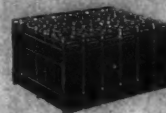
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STORAGE BATTERIES



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Mining Trainees

More than 2300 World War II veterans are training under the G.I. Bill and Public Law 16 to become mining engineers and to fill other mining occupations. Ninety per cent of the veterans training in mining occupations, or 2012, were studying mining engineering in colleges and universities. One hundred veterans were training on-the-job under the G.I. Bill as mining machine operators, and 135 were taking job training under the same law in other occupations related to the extraction of minerals.

Fifty-nine disabled veterans were taking job training under Public Law 16 in a number of mining occupations that they could perform despite their physical handicaps.

Coal-Dust Explosion Gallery

A small, portable coal-dust explosion gallery, designed to show how a cloud of bituminous coal dust will explode if ignited by a spark or flame, is in use by Bureau engineers, coal mine inspectors, and safety instructors to illustrate the dangers of an ignition of coal dust and to point up the need for rock-dusting to prevent widespread explosions in coal mines.

A transparent plastic tube 10 in.

long and a little over 2 in. in diameter comprises the explosion chamber of the device. A spoonful of fine coal dust is pumped into this chamber, an electrical filament ignites this dust, and the resultant explosion blows out a paper diaphragm at the top. Housed in a wooden carrying case, the entire apparatus weighs only 21 lb and can be assembled in a few minutes.

Goodyear-Owned Mine Closes

Wheeling Township Coal Mining Co., near Duncanwood, Ohio, has been closed after 30 years of operation because of depletion and competitive conditions. The mine is owned by Goodyear Tire & Rubber Co. Last year the mine produced about 700,000 tons and has an estimated reserve of 3,000,000 tons. Hanna Coal Co., Cleveland, is negotiating to purchase the tippie, track, and other properties of the mine but does not plan to resume underground operation.

Kentucky Mine Purchased

The old Pioneer mine at Kettle Island, Ky., has been purchased by O. H. Viall of Barbourville. Plans call for opening up new mining operations on 8000 acres nearby.

New Coke Plant

Republic Steel Corp. has awarded Koppers Co., Inc., a contract for the construction of a battery of Koppers by-product coke ovens, plus materials and handling facilities, at its Youngstown, Ohio plant. The installation will replace the present No. 2 battery of 75 ovens. New ovens are expected to be in operation about the middle of 1950.

Marshall Plan Purchases

ECA recently announced negotiations to date with Marshall Plan countries for the purchase of critical materials totaling \$53,397,364. They include such commodities as rubber, sisal, industrial diamonds and bort, quinidine, graphite, kyanite, cobalt, lead concentrate, palm oil, sperm oil, and platinum. Approximately \$39,500,000 represents outright purchases. The balance represents signed contracts for future deliveries from ECA-approved projects of participating countries. Negotiations are pending for the purchase of additional materials needed by the U. S. A. Most of the critical materials obtained so far were purchased with local currencies from ECA counterpart funds.

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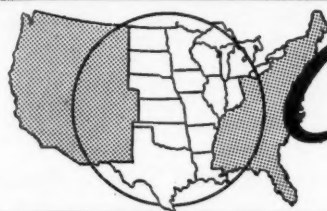
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The Parmanco Horizontal is adapted to all forms of high-wall drilling, will handle a six-inch auger up to a distance of sixty feet or more and, by use of our patented augers with interrupted flights and secondary cutters, will drill an absolutely clean hole with a minimum of torque. It permits the drilling of a controlled-angle hole which makes possible a great saving of explosives through the cantilever effect of this controlled-angle drilled hole.

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Central States

U. of Illinois Promotes Coal Interest

From June 20-24 a short course in coal mining engineering was held for a group of 40 Illinois high school principals at the University of Illinois. The course covered briefly what coal mining is and what the future holds for coal mining engineers in the industry. The great strides that have been made by the industry in mechanization and safety were outlined. It was pointed out that there is still plenty of room in the coal industry for graduate mining engineers.

Henry C. Woods, chairman of the board, Sahara Coal Co.; M. D. Cooper, vocational training director, Bituminous Coal Institute; and members of the mining engineering department of the University of Illinois addressed the group in the course of the five-day program. On the fifth day, open pit and underground mines and plants were visited.

In his address Mr. Woods pointed out that coal mining engineering should be drawing more capable young men than it is today. He added that the opportunities in the coal mining industry are great and that qualified well-trained men are essential to continue the progress within the industry.

Hiawatha Shaft Sinking

The Hanna Iron Ore Co. is making plans to begin deepening of the No. 2 shaft of the Hiawatha iron mine. The additional 200 feet of the vertical shaft located on the south side of Iron River, Mich., on the Menominee iron range will make the shaft 2300 feet deep, the deepest in the district. Plans call for the placing of a crusher underground.

Champion Mine Resumes Production

After almost 40 years of inactivity the Champion mine at Champion, Mich., on the Marquette iron range, resumed production on March 8, 1949. The North Range Mining Co. leased the property from the Oliver Iron Mining Co. two years ago. Since then the mine has undergone dewatering and a headframe, engine house, miners' change house, and mine offices have been built. Pumping began January 1948 and was completed in December.

The present mining operations will

be conducted by heading-and-bench methods. Broken ore will be brought by scrapers and scraper hoists to ramps below which cars will be spotted. Storage battery locomotives will handle cars on the level. At present ore is being trammed on the 24, 26, and 29 levels. Both cars and skips are of 4-ton capacity. There are no storage pockets at the levels.

Work is going forward under the direction of Frank Werther, assistant general superintendent, North Range Mining Co., and Bryan Farragh, mining captain. It is expected that the Champion's yearly shipments will run about 100,000 tons of ore.

Copper Range Co. Anniversary

The Copper Range Co. operating mines in northern Michigan marks 1949 as its 50th anniversary. Since its organization in 1899 a total of 1,233,570,000 lb of copper have been produced from which the company has received an over-all average price of 15.7c per lb.

An outstanding development in the future of the company was the acquisition and exploration of the White Pine orebody, considered one of the largest undeveloped copper deposits of the world. The total estimated positive plus probable ore reserves are listed at 199,610,000 tons of ore

carrying 22.3 lb of copper per ton, including 106,770,000 tons of parting shale ore averaging 25.3 lb per ton.

It was recently announced that more efficient mining and milling methods have been developed which reduce the estimated capital outlay for developing the White Pine property. In a test milling circuit at Freda some 124,000 lb of copper have been produced. Results of the laboratory and pilot plant tests indicate substantial improvement over previous estimates of the grade of concentrates and mill recovery.

Structure Drilling Plan

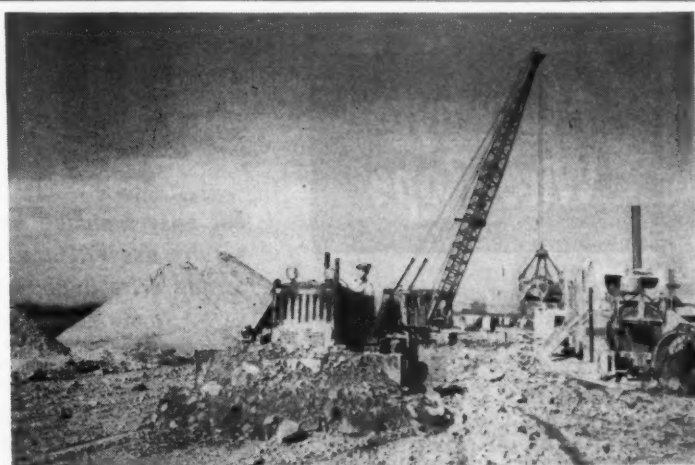
A structure-drilling program has been planned to test an area northeast of the old pit of Interstate Iron Co.'s Hill-Annex mine near Calumet, Minn. The program is aimed at determining the extent of lean ore in that area.

Negaunee Mine Closes

After producing a total tonnage of 20,400,000 tons, the Negaunee mine, Negaunee, Mich., one of Cleveland Cliffs Iron Co.'s largest producers of iron ore, ceased production during the last week of April. The majority of the employees have been transferred to the Mather "A" mine which is now the company's largest producer.

Grant Heavy-Media Plant

A semi-portable heavy-media plant is nearing completion at the Grant iron mine, Buhl, Minn., for the Interstate Iron Co. Operations are scheduled to begin during July. This installation adds to the growing number of ore beneficiation plants on the Mesabi iron range.



Near Hanna, Ill., the Peabody Coal Co. has construction of a new mine underway. The mine, which will have all modern safety provisions and employ a force of 500 men, is expected to be in operation by the summer of 1950. Two 18 by 21-ft. shafts are being sunk to a depth of 721 ft.; one is already down 400 ft.

Lake Ore Movement

Iron ore brought down the Lakes through June 18 totaled 28,727,032 tons, according to the Lake Superior Iron Ore Association. This compares with 26,776,447 tons in the same period of 1948.

J & L Leases Ontario Ore Field

The Jones & Laughlin Steel Corp., through its subsidiary, Jalore Mining Co., Ltd., has taken up an option on the iron ore mining property known as the Ruth and Lucy mines in the Algoma district of Ontario, Canada. The company's lease is for 50 years and explorations indicate ore bodies of approximately 30,000,000 tons.

Ozark Ore Enlarges Shaft

The Ozark Ore Co., Iron Mountain, Mo., is now engaged in enlarging its hoisting shaft to the first level of the mine. Upon completion of this work the new level will be opened up by deepening the shaft. The underground section of the property has been idle for many years with production coming entirely from an open pit. Silicious iron ore is treated in a jig plant. The Ozark Iron Co., a subsidiary of the M. A. Hanna Co., was organized

in 1943. It is practically the sole producer of iron ore in Missouri.

Land Reclaiming

A plan has been started to reclaim some 4000 acres of strip land in Jefferson County, Ohio, and convert them to a model cattle ranch and agricultural plant. Michael L. Benedum has begun the long-range program by purchase of 30 tracts of strip land in Island Creek, Cross Creek, and Knox Townships in Jefferson County.

Drew Mine to Reopen

The old Drew mine, located near Buhl, Minn., on the Mesabi iron range, has been reopened by the firm of Hedman and Strand, Hibbing, Minn. Stripping operations have been started with a 1½-cu yd shovel and 3-cu yd dump trucks. A small semi-portable Pioneer washing plant has been received and erected.

Copper Country Maps

Detailed geologic maps of the recently active copper mines in Houghton and Keweenaw Counties, Mich., have been placed in open file for public inspection, by the U. S. Geological

Survey. Accompanying the maps is a descriptive text. Detailed studies on which the maps were based were conducted from 1942-1946 by the Geological Survey as part of its war-time program of investigation of copper deposits.

Tri-State Mines Suspend Operations

On June 30 most zinc mining operations in the Tri-State district of Missouri-Kansas-Oklahoma were shut down. The Eagle-Picher Mining & Smelting Co., major producer and smelting company in the area, closed 18 mines and its big Central Mill at Cardin, Okla. Employment has been reduced from a high of 4000 workers early in 1948 to about 500.

Suspension of operations has been attributed primarily to the lack of balance between production schedules and estimated sales for the remainder of the current fiscal year. Management expressed the hope that the shut-down will be relatively brief and that improvement in general economic conditions will warrant resumption of operations at an early date.

Two producers, the St. Louis Mining & Smelting Co., and the Nellie B. Mining Co. are continuing operations on a limited scale.

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New Shaft Mine

Near Farmersville, Ill., the Freeman Coal Mining Corp. has opened a new shaft mine. The tippie, rails, and other equipment recovered from a nearby abandoned mine will be moved to the new site.

Iron Ore Operations Cut

On July 5, production at the Greenwood iron mine of the Inland Steel Co. at Ishpeming, Mich. was reduced 50 per cent. Because of the reduced demand for iron ore, Cleveland-Cliffs Iron Co. and Midland Steel Co. have cut their weekly work period from 48 to 40 hours at all mines on the Marquette range.

Initial Gasifier Test

A significant development in the production of synthetic liquid fuels from coal was announced by the U. S. Bureau of Mines with the report of the success of a full-scale test run made in the new coal gasification unit in Louisiana, Mo. A part of the Fischer-Tropsch gas synthesis demonstration plant—probably the largest unit ever installed for direct production of synthesis gas from finely powdered coal and oxygen—is the second of the plant's five units to be completed. The oxygen production unit has been in operation for several months and remaining units for gas purification, hydrocarbon synthesis, and product refining will be finished and in operation during 1950. Solution of the problem of low-cost gasification is essential before competitive gasoline and oil may be made from coal by either of the two basic processes employed at the Louisiana, Mo., plant. Synthesis gas produced by the Fischer-Tropsch process for the gasification of coal comprises roughly 60 percent of the cost of the liquid fuel product.

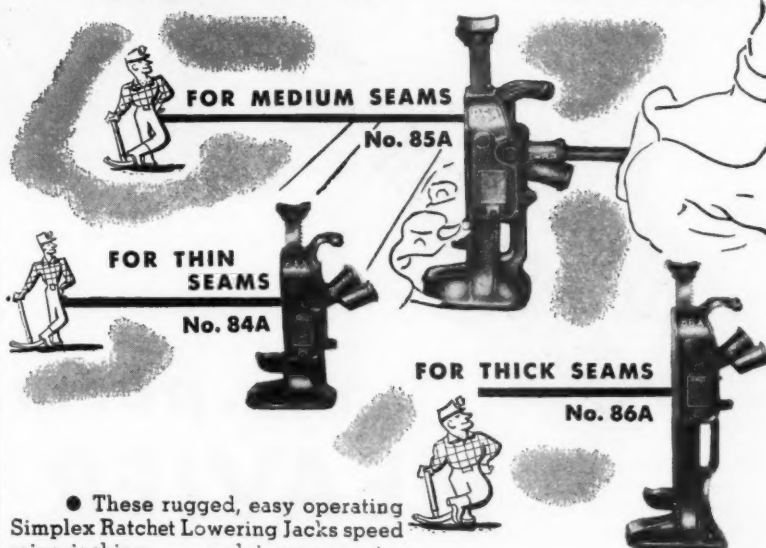
In a ten-hour period of operation, a four-hour test was made with all six burners operating at design capacity and with gasifier temperatures averaging about 2200 F. During this test there was no evidence of any undesirable condition at the time of the voluntary shutdown. Coal is fed to the unit at the rate of 2300 lb per hour; oxygen at the rate of 17,000 cu ft per hour; and steam at the rate of 2000 lb per hour. Approximately 70,000 cu ft per hour of gas were produced; containing 37 percent carbon monoxide; 42 percent hydrogen; 16 percent carbon dioxide; 4 percent nitrogen; and 1 percent miscellaneous. It is hoped that higher yields of still better synthesis gas will be made in subsequent runs after the operating characteristics of the new gasifier are better known.

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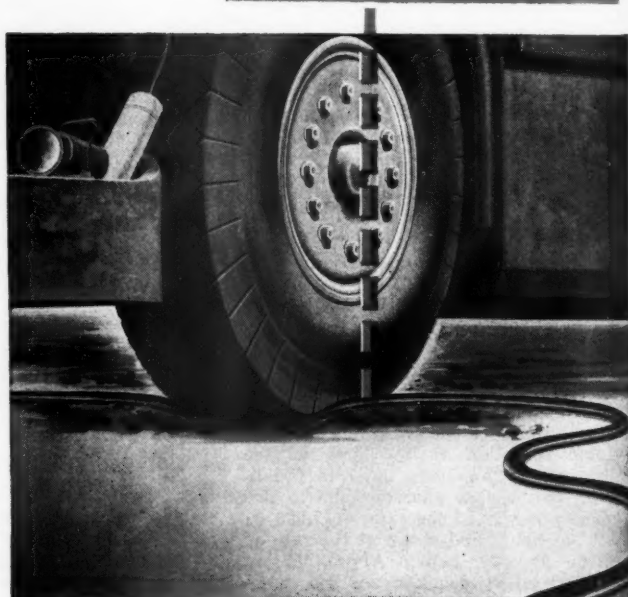
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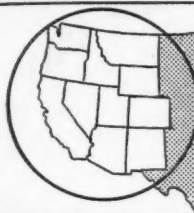


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Western States

Coal Producers Elect Officers

At the annual meeting of the Coal Producers Association of Washington, Earl R. McMillan, assistant manager of coal operations, Northwest Improvement Co., was elected president. Other officers elected at the meeting include William Strain, Strain Coal Co., first vice-president; Harry Merbach, vice-president in charge of sales, Bellingham Coal Mines, second vice-president; and James E. Ash, secretary-treasurer.

Members of the board of trustees were elected as follows: Thomas Murphy, Harry S. Patrick, Fred Bianco, James Bolde, John H. Morris, and George W. Sheatsley.

Old Abe Reopens

The Old Abe mine, in the White Oaks Mining District, Lincoln County, N. M., has been reopened after a lapse of some 50 years. Donald and Forrest Queen of White Oaks, with a Los Angeles associate, have formed the QBC Co., Inc., to operate the mine, a famous gold-silver producer in the early days. The 1380-ft shaft is being reconditioned to the 650-ft level, and a hoist, Diesel power plant and other equipment will be installed. If initial development warrants, the company plans later to install a mill on the property.

Uranium Production

A major uranium development-and-production program is being conducted by the Vanadium Corp. of America and the Atomic Energy Commission on the Navajo Indian Reservation of northeastern Arizona. According to Charles H. Dunning, director of the Arizona Department of Mineral Resources, Phoenix, more than 200 tons of uranium bearing ore are being mined daily from these deposits. It is understood that the AEC is planning for an extensive diamond drilling program in 1951 on the Navajo Reservation, but so far no announcement has been made as to the exact location.

At present there are four uranium processing plants in operation. These are located at Durango, Naturita, and Uravan, in Colorado, and at Monticello, Utah. They are treating 500 tons of ore daily, 250 tons of which

comes from deposits within Colorado, the only state which currently exceeds Arizona in uranium ore production.

A fifth reduction plant is under construction at Hite, Utah, on the Colorado River. It is being erected by the Vanadium Corp. of America, and is designed to process the copper-uranium type of ore, such as that discovered at Hacks Canyon in northwestern Arizona.

Open-Pit Silver Mine

Production of silver ore at the rate of 1200 tons monthly is reported from the Silver Reef group of two claims in the Casa Grande mining district of Arizona. A double-drum slusher is the principal piece of equipment on this open-pit project. The Silver Reef is owned by I. N. Clausen of Phoenix and is leased to Sherwood Owens. Four men are employed at the mine under the supervision of A. W. Gerhardt, manager, Box 493, Casa Grande, Ariz.

Gilsonite Plant Nears Completion

A plant near Bonanza, Uintah county, Utah, for introduction of gilsonite into the Rangeley-Salt Lake pipe line will be completed near the end of July, according to E. F. Goodner, vice-president, American Gilsonite Co. A test run on the introduction of powdered hydro-carbon into the pipeline is expected shortly after completion.

Pride of West Will Reopen

W. L. Chase, local manager of the Great Eastern Mining Co. in Silverton, Colo., has announced that his company has negotiated for the Pride of the West and an adjacent mine and will reopen it this summer. The historic old mine for years was San Juan county's second largest mining operation. It was closed down in 1948.

Roundup Coal Mine Closes

One of Montana's largest coal mines has been closed down after 41 years of continuous operation. S. H. Clarke, manager of the Roundup Coal Mining Co., said the company's No. 3 mine at Roundup was closed June 1. Negotiations are under way with several outside interests to buy or lease

the property. Clarke said the mine employed about 230 men when in full production and is equipped to produce 2000 tons of coal daily. About 200 men were working when the mine shut down. Only a small maintenance staff is still working. The No. 3 is the largest mine in Roundup.

Ajo Construction Program

Contracts totaling more than \$1,000,000 have been let by Phelps Dodge Corp. as a part of its improvement program for the New Cornelia Branch, Ajo, Ariz. The major items in new construction are:

A new change room for mine employes, the building being of sufficient size to provide shower and dressing facilities for 450 men at one time, as well as a separate foremen's locker room; a two-story wing to the Ajo hospital; an eight-room addition to the elementary school; an office and laboratory building near the smelter now under construction; erection of 101 new residences, 74 of which will be placed on an entirely new townsite north of the community, and 25 on a new site south of town.

The 1949 improvement program follows similar programs in 1948 and 1947, each of which involved more than \$800,000. Last year 80 houses, a men's dormitory, a mine superintendent's office and three superintendents' residences, and a teachers' apartment were erected. In 1947, new construction included a mill change house, a new theater, stores, and recreation building and library.

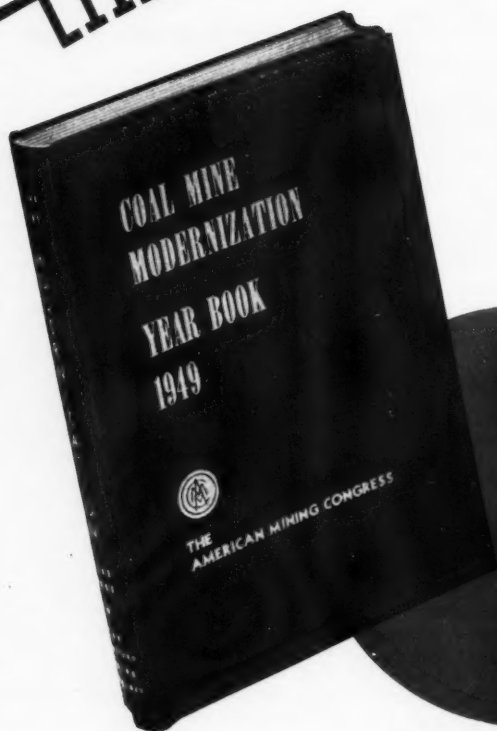
Newmont Develops Gold Vein

Mining operations of Newmont Mining Corp. are now concentrated on development of the White Rock vein, discovered two years ago in a virgin section of the Goldfield district of Nevada. Superintendent Elmer Burt reports all underground workers have been shifted to a point 300 ft south of the White Rock shaft, to sink a winze on a good grade of ore 15-18 ft wide. Ore from the winze will be trammed to the Florence shaft and dumped into bins feeding the mill.

Kelley Shaft Stopped

Officials of the Anaconda Copper Mining Co. in Butte, Mont., announced the temporary deferment of the sinking of the Kelley shaft and filling operations in progress as part of the Greater Butte Project. At the same time the suspension of operations at the Belmont and Orphan Girl mines was revealed. Prevailing economic conditions were cited as the reason. Also, effective June 6, the Butte operations were placed on a five-day week basis for the miners, although the mines will continue working six days. This represents the fourth mine

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suspension in Butte within the last month, the Lexington and Alice mines, which have been under development, having been suspended four weeks earlier. The Orphan Girl has been a zinc producer and the Belmont a copper producer. The company operations at Great Falls and Anaconda have been on a five-day week since the end of the war.

NM Meeting Plans

The New Mexico Miners and Prospectors Association will hold its 1950 annual convention in Silver City. The dates set for the meeting are January 19-20-21. Joseph H. Taylor, vice-president and general manager of the Peru Mining Co., Hanover, N. M., will serve as the general chairman.

ASARCO Options Tombstone Group

The American Smelting and Refining Co. has been granted an option to purchase the old Tombstone Extension group of claims, east of Tombstone, Ariz., the option being effective until September 1. Announcement of the transaction was made by Charles M. d'Autremont of Tucson, Ariz., trustee for the Tombstone Extension. It is said that A. S. & R. plans to explore for silver and lead ore bodies believed to exist at considerable depth. In addition to the d'Autremont holdings, the option agreement covers the Wide West, the San Diego, Plum, and Belcher mines and property.

Consolidated Coppermines Suspends Operations

On June 30 all underground operations were suspended by Consolidated Coppermines Corp. at its properties in Kimberly, Nev. Open-pit operations continue on a five-day schedule. In announcing the curtailment Chester D. Tripp, president, stated that "the spread between costs and the present market price of copper" was responsible.

Sullivan Extends Holdings

The Sullivan Mining Co., owned jointly by the Bunker Hill & Sullivan and Hecla Mining Cos., has further increased extensive holdings in the Metaline zinc-lead field in northeastern Washington and southern British Columbia by purchase of the Metaline Contact mines. Recently the Sullivan Co. purchased a \$3,500,000 interest in the Pend Oreille Mines & Metals Co. A portion of the investment money has gone into the construction of the 1000-ton concentrating mill at the Reeves MacDonald property on the British Columbia side of the boundary.

The Sullivan Co. now has an interest in five Metaline operations, all of which are more or less connected or adjacent to the Pend Oreille property, thus giving the company control of about 20 sq mi of the field.

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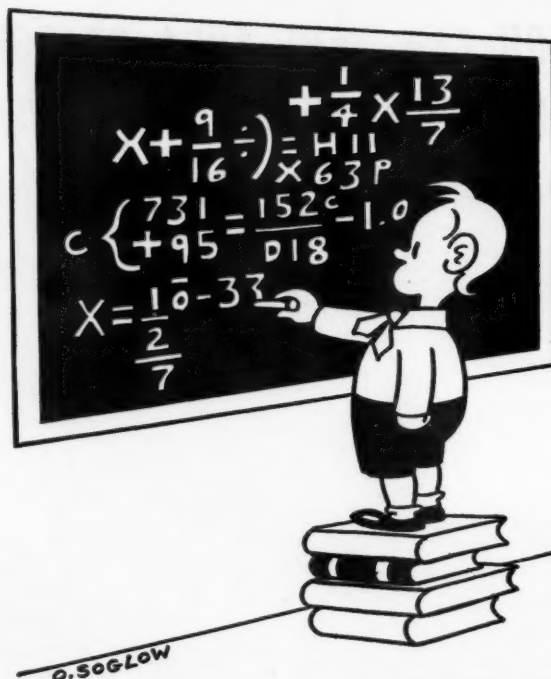
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For example . . .

To give you some idea of the Plan's growing popularity: 86,384 employees of a prominent electrical manufacturing company were investing in Bonds at the rate of \$30,005,270 as of the end of 1948. This is a gain of nearly 100% over 1947, when 45,000 employees participated in that company. The treasurer of a well-known shoe company reported that, of his concern's 19,060 employees, 9,240 were in the Plan and had invested \$146,807.32 in Bonds via deductions during the preceding month.

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2. Secure the help of the employee organizations in promoting it.
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4. Make a person-to-person canvass, once a year, to sign up participants.

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Mt. Con Mine No. 2's winning team



Patients line up as teams discuss problem

Annual Butte First-Aid Contest

IN a tightly contested race in which only 1.52 points separated the first and last place teams, the Mountain Con mine No. 2 team took first place in the annual first-aid contest conducted by the Anaconda Copper Mining Co. in Butte, Mont. The event featured the program of the 71st Butte Miners Union Day traditionally celebrated on June 13, the birthday of the Butte Miners Union in 1878. Runner-up honors went to the team representing the sampling department followed by the Leonard mine No. 2 team. Prizes were: first \$210; second \$175; third \$105 and \$35 each for all other competing teams. In all, 12 teams participated, finishing in the following order:

- (1) Mountain Con Mine No. 2. 99.36
- (2) Sampling Department . . . 99.24
- (3) Leonard Mine No. 2. 99.08
- (4) Mountain Con Mine No. 1. 98.88
- (5) Orphan Girl Mine. 98.88
- (6) Travona Mine 98.80
- (7) Emma Mine 98.76
- (8) Leonard Mine No. 1. 98.76
- (9) St. Lawrence Fire-Fill . . . 98.40
- (10) Belmont Mine 98.28
- (11) Anselmo Mine 97.96
- (12) Badger State Mine 97.84

In the contest five full-team problems were worked. As teams lined up captains were handed sealed envelopes in which hypothetical cases were described. The teams then went into action applying skill and knowledge acquired during a first-aid training program started on January 10 and in which over 500 men completed the first-aid course conducted under the guidance of the U. S. Bureau of Mines.

The contest was judged under the rules of the Butte system which differs from the standard system of judging in that all five problems are worked by different teams simultaneously and one judge is assigned to each problem. This is designed to eliminate as much as possible the differences of opinion frequently existing between judges.

The manner in which the contest is

judged is for each team to be assigned a credit of 500 points for each problem. A list of possible mistakes is compiled and a definite number of points assigned that mistake. These are deducted from the total credit as mistakes are made. The amount of the discount assigned each mistake depends upon the seriousness of the error. The final score is then figured on a percentage basis from the scores of each problem.

This was the 25th renewal of the original first-aid contest held in 1915 for all Butte mines. In that contest 43 teams competed representing each of the mining companies operating in Butte at that time. Later that same year a contest was held among Anaconda teams to determine a champion

Study Eureka Water Problem

Officials of the Eureka Corp., Eureka, Nev., recently reported a number of plans under consideration for reorganization of the company and resumption of operations at its Richmond-Eureka property near Ely, Nev. The corporation has engaged Ira B. Joralemon and W. E. Romig to study the water problem at the mine and determine the best method for future operations. President Thayer Lindsey has outlined a plan to free the company of capital indebtedness, which would involve stock transactions with Northfield Mines and Ventures, Ltd., both of which are creditors of Eureka Corp. Mining operations were stopped at the mine in March 1948 by a heavy flow of water. Diamond drilling carried on a few years ago disclosed large deposits of lead-silver-gold-zinc ore at an approximate depth of 2400 ft in the Richmond-Eureka, below the Ruby Hill fault.

The company sank a new shaft, the Fad, to a depth of 2415 ft early in 1948 and started crosscutting toward an ore body about 800 ft west of the shaft. About 1600 gpm were being

to represent the company in the international contest held in San Francisco. Since then many Butte and Great Falls teams have taken highest honors at many international meets conducted by the U. S. Bureau of Mines. The Butte contests were suspended during both World Wars. Members of the winning team were: Richard Evered, captain; John Godynich, Hugh McDermott, William Rogers, John Maloughney, Ray Rashleigh, William Trevenna. Joseph Harkins is safety engineer and coach, Vic O'Leary is mine foreman.

Officials and judges were foremost authorities in the field of first-aid from Salt Lake City, Missoula, Butte, Anaconda and Great Falls. Field Marshall was Lester Naus of the U. S. Bureau of Mines and chief judge was Professor O. A. Dingman of the Montana School of Mines.

pumped from the shaft when, in March, an additional 2000 gpm was encountered about 125 ft west of the shaft, complicating development efforts.

Coking Coal Find

Kaiser Co., Inc., announced that extensive drilling tests have proved a potential new source of "more than 30,000,000 tons of high grade coking coal" in the mining areas of Central Utah. New coal deposits are said to lie in 2560 acres of land which the Kaiser Co. last year leased from the U. S. Department of Interior, some 24 miles east of the town of Price, Utah. The tests disclosed coal seams 11-14 ft thick.

Monazite Production

Now in its second year of operation, the Rare Earths Mineral Co., McCall, Idaho, is extracting monazite sand from old and new placer deposits believed to be the largest in the world. The company is reported to have contracted to ship 16,000 tons of concentrated sand during the next ten years. Gold, garnet, and zircon in small amounts accompany the monazite.

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Jumbo Gold Mine

Power shovel mining is proceeding steadily at the Jumbo gold property in the Awakening district near Winnemucca, Nev., being operated under lease by Red Ledge Mining Co. The 500-ton, amalgamation-type mill is handling approximately 300 tons of ore daily. Full capacity operations are planned in a few weeks. The ore body is a surface deposit of shattered sandstone and shale about 600 ft wide and 2000 ft long, with quartz-filled fracture planes containing free gold. The Jumbo was a notable producer of high-grade ore before the war.

Copper Operation Closed

Phelps Dodge Corporation has announced the cessation of copper production at its Copper Queen mine, Bisbee, Ariz., on June 5. Lead and zinc production from the Copper Queen, the management said, will continue as long as conditions permit. More than 350 men have been laid off and the remaining personnel has gone on a 40-hour work week schedule.

Company officials said that production may continue at the New Cornelia Branch at Ajo, and at the Morenci Branch at Morenci, both open-pit operations. However, the work week has been reduced to 40 hours. Under this schedule the properties will operate ten days and close down four days out of each two-week period.

Operations at the company's United Verde Branch at Jerome are not affected at the present time. Officials said that activities at Jerome might be described as those of liquidation and probably will continue until ore reserves are exhausted, "in the near future." Phelps Dodge had announced and subsequently postponed closing the United Verde on two different occasions, each time revising its plans because of the rising price of copper. In March of this year it was stated that unless new discoveries were made, it appeared that the mine would shut down in a year or two because of exhaustion of ore reserves. Some of the equipment from United Verde's smelter at Clarkdale is being moved to Ajo.

The Copper Queen mine has been one of Arizona's great copper producers and has played a major role in the development of the state. In recent years, it has been the leading producer of lead and zinc.

The cessation of copper production at the Copper Queen was the second major blow to Arizona's copper industry since the price decline. Earlier, Inspiration Consolidated Copper Co. announced a cutback in production of 20 percent and the dismissal of 180 men. Since then practically all major producers in the state have reduced the working schedule to a 40-hour week.

Silver Star Queens Mine

Officials of the Silver Star Queens mine have completed negotiations with the Minnie Moore mines for use of their Rockwell vertical shaft in reaching the 500-ft level of their mine. Both properties are near Bellevue, Idaho. Rehabilitation thus far includes installation of a 50-ton hoist and the acquisition of a new head frame for the Queen mine. Also under way is the driving of a tunnel into the shaft from the floor of the valley, to retimber from there to the surface, and concrete the collar before erecting the new head frame. Stations have been cut in the Rockwell shaft at the 250 and 450-ft levels. An estimated five months will be required to finish the Rockwell shaft preliminary work after which the Silver Star Queens firm can drift on their veins and reach additional depths below old workings. At present the Queen mine is sinking a two-compartment shaft to go to the 462-ft level with approximately 100 ft already accomplished.

Dragline Moves Across Country

Recently the Park Coal Co., Walsenburg, Colo., was faced with losing considerable time moving an electric walking-type dragline weighing 115 tons five miles from its original location. Rather than dismantle the huge machine to transport it to the Victor-American Ravenwood mine from the exhausted Colorado Fuel & Iron Corp.'s Pictou mine, it was found more economical and quicker to move the rig overland by walking. Two Diesel-electric sets were coupled with three large transformers and mounted on a standard truck-type trailer. These units transmitted the required power through an electric cable to the dragline and enabled the rig to make the move in three days.

Telephone and power companies, railways, property owners, various construction firms, and county officials cooperated in giving the unique caravan a right of way to its new location.

Galena Shaft Sinking

The Galena shaft at the Vulcan Silver-Lead property west of Wallace, Idaho, is now down more than 2100 ft, it was announced by officials of the American Smelting and Refining Co. It is expected that about a year will be required to complete the work to the 3000-level or sea level. The old Galena shaft of the Callahan Zinc-Lead started as a two-compartment job and was changed to three-compartment at an intermediate level. It has since been increased to a square, four-compartment shaft.

Day Mines, Inc., has a quarter interest in the shaft.

BOOK REVIEWS

MINING GEOLOGY. By H. E. McKinstry, with sections by S. A. Tyler, E. N. Pennebaker, and K. E. Richard. Prentice Hall, Inc., N. Y. \$10.00. 1948. 680 pages.

ON the basis of his known wide experience together with that of other geologists, Professor McKinstry has presented an exceptionally readable book on the art of the mining geologist. It begins with an introductory section describing the role of geology in the mining industry. The balance of the book is divided into four parts dealing with assembling geological data, geological principles of ore search and ore appraisal, application of mining geology to specific phases of mining, and the technological characteristics of ore.

Geologic mapping, sampling ores and calculating tonnage, drilling, physical investigation, laboratory methods, and correlating data are presented in Part I. Good advice and practical methods are keynoted and recommended techniques are described in detail. The means of handling erratic assays are discussed in a chapter on sampling. The method of planning a drilling campaign is described in considerable detail.

In Part II, chapters are presented on the use of fact and theory, targets of loci, physiographic, mineralogic, stratigraphic, and lithologic guides plus additional subjects. Part III deals with field exploration, examining and developing prospects, and the value of mining properties in addition to the geological work that should be undertaken in actual mine operations. The writing and reading of reports is given due consideration. Part IV is concerned with the amenability of ores to treatment, marketable forms of metals and ores, and various appendixes plus a glossary of mining and geological terms.

Professor McKinstry's book fills a long-felt need of junior geologists in particular and is recommended reading for all who are interested in or engaged in practice of mining geology and mining.

MINE ACCOUNTING AND FINANCIAL ADMINISTRATION. By Frank Willcox. Pitman Publishing Corp., New York. \$7.50. 1949. 489 pages.

MINING administration is approached from the viewpoint of the responsible parties with whom the task of managing rests. Data is presented on the technical operations of prospecting, developing, mining, milling of ores to enable complete grasp of the complexities of mining operations by the uninitiated and for

the experienced to properly place each accounting procedure outlined.

Organization of the material makes the book especially useful to establish accounting control of operations from the period of discovery to the existence of the property as a prospect and on through the time that it becomes an established producer. In 16 chapters the author has covered every phase of accounting and financial administration as applied to mining. In six appendixes, based primarily upon Canadian mining industry, case histories are presented on taxation, smelter returns, and exchange control provisions.

The principles of accounting systems are sufficiently elaborated to enable the reader to tackle any problems encountered in mining accounting. The inclusion of test questions enhances the value of the book for study purposes.

METAL MAGIC—THE STORY OF THE AMERICAN SMELTING AND REFINING CO. By Isaac F. Marcossan. Farrar, Straus and Co., New York, \$4.50. 1949. 313 pages.

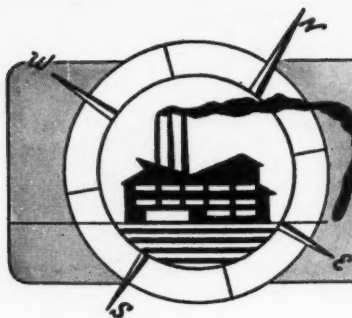
IN vivid English, this narrative of the 50-year expansion of the American Smelting and Refining Co. presents an absorbing story of American industry. The humor and drama of mining are woven in the fabric of the book and closeups are given of many of mining's fabulous figures.

The 15 chapters cover the entire story of Asarco's world-wide operations. Throughout its pages weaves the story of the rise of the Guggenheims.

Unlike many histories of industrial enterprises, this book is one which will hold the reader's interest from start to finish. Although full of the technical and economic data pertinent to the growth of a great mining empire, it grasps the reader's interest from the first page on. As one reads with eager interest of the expansion of the American Smelting and Refining Co., one truly thinks that truth is stranger than fiction.

CHAMBER'S MINERALOGICAL DICTIONARY; Chemical Publishing Inc., Brooklyn, N. Y. 1948. \$4.75. 47 pages.

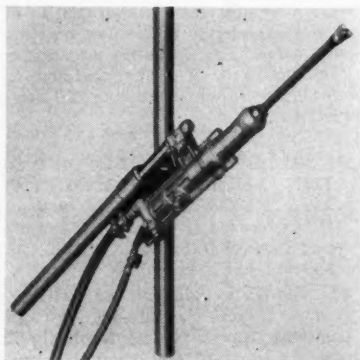
MORE than 1400 minerals are listed with their chemical composition, crystal form, physical and chemical properties, occurrences and uses. Forty plates in their original colors illustrate approximately 200 minerals. These exceptionally fine plates are of great value for aiding recognition of these minerals.



Manufacturers Forum

Air Feed Sinkers

Two air-feed sinkers have been developed by Le Roi-Cleveland, Milwaukee, Wis., which employ an integral reverse air-cylinder type feed. Le Roi Co. officials state that the HC10R and

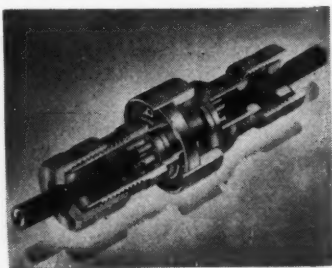


HC23R have proved to be one of the few American-made drills to operate satisfactorily with carbide insert bits and make them last long enough to be used economically. The non-rigid air-cylinder type feed provides clearance for cutting, but is reported not to allow inequalities in rock structure to permit damaging impacts to carbide bits.

Construction of the air-feed sinkers permits rotation by one hand around the feed cylinder without the need of loosening swing or dump nuts to clear for longer steels.

Waterproof Coupling

A quick disconnect electrical coupling for all-weather and submarine applications is a new development of Roylyn Inc., Glendale, Calif. It is



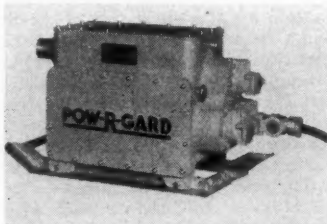
designed to meet the rigid requirements of industries requiring an electrical connector that is quick acting, heavy duty, impervious to moisture and capable of withstanding long periods of complete immersion under high pressure without leakage.

Automatic Sampler

Automatic sampler takes periodic cuts from a stream of moving material, either wet or dry, at any stage in a continuous process. Hardinge Co., Inc., York, Pa., offers a unit which can be set to take cuts at time intervals of from 5 to 60 minutes. The sample cutter moves horizontally at a constant speed across the stream of moving material, diverting a sample into a launder or container.

Power Distribution Systems

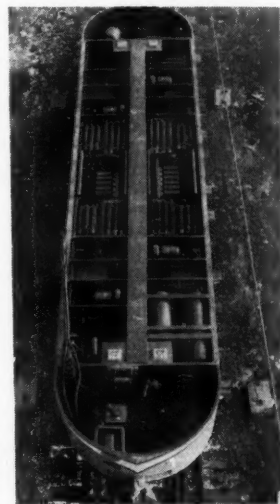
POW-R-GARD and GROUND-GARD are trade names given to two new, portable mine electrical power distribution systems, either ac or dc,



produced by Albert & J. M. Anderson Mfg. Co., Boston, Mass. They combine circuit breakers, for automatic rapid circuit interruption when any of the electrical faults common to mining occur. Enclosed in dust-tight steel or explosion-resistant cast aluminum, the runner-mounted boxes are designed to withstand the arduous operating conditions found in mining. They are small enough for use in low coal seams. The units are equipped for use with three- or four-conductor portable cable, rather than special cables consisting of power and control wires. Push-pull circuit breaker operating handles are mounted on the box ends beside the power outlets they control.

High-Speed Locomotive

A new 30-ton, high-speed, four-axle, mine-haulage locomotive has been announced by General Electric's locomotive and car equipment divisions. The



locomotive is designed for long runs where the distance from the gathering point to the tippie is five miles or more. Its maximum permissible speed of 35 mph reduces haulage time. Operating from a 250-v trolley system, the unit is equipped with straight air brakes, a 15-cfm, motor-driven geared air compressor, edgewise-wound resistors, sealed-beam headlights, and a cam-operated typemaster controller. Maximum drawbar pull is 18,000 lb.

Scale Model Dragline

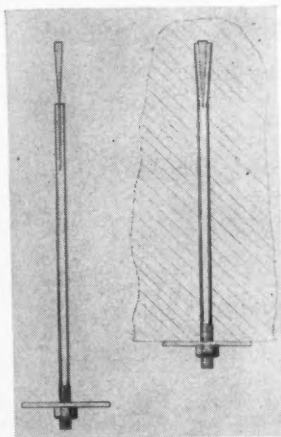
At the 1949 Coal Show of the American Mining Congress, Marion Power Shovel Co., Marion, Ohio, unveiled a working, built-to-scale miniature model of a giant walking dragline. The miniature 7400 model dragline is built on a scale of approximately 1 in. to 1 ft. One of the features of the Coal Show, the model dragline was connected electrically to do everything the full scale dragline can do.

Midget Air Hoist

Ingersoll-Rand Co. has announced a new midget, single-drum, utility hoist which will lift a 600-lb load at 50 fpm. The hoist is equipped with a reversible, four cylinder, radial, piston-type air motor, safety type throttle, and a wide band-type brake. A convenient clutch lever disengages the drum. The midget hoist weighs 72 lb less rope.

Mine Roof Supports

The production of two types of the new mine roof support bolt has been announced by Oliver Iron and Steel Corp., Pittsburgh, Pa. Roof bolts are available, both in slot and wedge type,



and in the expanding sleeve design. Roof bolts are installed as a means of roof support by drilling a hole in the mine roof slightly more shallow than the length of the bolt to permit the threaded end to protrude approximately the thread length. When the bolt, with wedge, is driven into the hole the shaft diameter expands and creates a solid anchorage. Steel channels, angles or washer plates are then placed on the bottom of the bolt and held fast with a nut to further reinforce the roof.

Perspective Drawings

A time-saving instrument called the "Perspect-O-Metric" is available from the Charles Bruning Co., Chicago. The instrument is designed to automatically guide the pencil in relation to the proper vanishing points in perspective drawings.

Test Benches for Laboratories

Fischer Scientific Co., Pittsburgh, Pa., has developed 18 different all-steel units, including drawers, cupboards, sinks, tables, storage cases, etc. Units are covered with plastic-impregnated stone which provides a smooth, black, corrosion resistant surface.

Rubber Tired Loader



A new rubber tired type 28 FA face loader has been announced by the Clarkson Manufacturing Co., Nashville, Ill., manufacturers of "Redbird" mechanical loaders. The new loader is 42 in. high, 72 in. wide, and 28 ft in length. One 50-hp motor operates the entire unit, with push-button hydraulic controls located in one central position. The front digging head has

a maximum loading range of 130 in., and by swinging the head and the chassis at the same time, operators can reach the corners as well as work in and around face timbers. The new loader contains the "Redbird" Uni-flight conveyor chain, with a capacity of 10 tons per minute. Both front and rear conveyors flex horizontally as well as vertically.

Micro-Altimeter

An altimeter graduated in intervals of one foot over a range of 6000 ft, designed to be accurate to one foot and sensitive to altitude changes in inches has been announced by American Paulin System, Los Angeles, Calif. The 4½-lb instrument is reported to

provide unusual accuracy and dependability in conducting altitude surveys.

The series of micro-altimeters will shortly be supplemented by a model with a range of 15,000 ft graduated in intervals of 5 ft, and a model with a range of 5000 m graduated in intervals of one meter.

Announcements

Donald M. Davidson has been elected a vice-president of the E. J. Longyear Co.

Henry V. Bootes, formerly assistant vice-president, has been elected vice-president in the sales department of the American Car and Foundry Co.

Ora F. Metz, district manager of Allis-Chalmers El Paso and Phoenix offices, retired July 1 after nearly 43 years with the company.

General Electric Co. has named William L. Immer as wire and cable specialist for the central district of the construction materials department.

Joy Manufacturing Co. has entered into an agreement to acquire Mines Equipment Co., manufacturers of mine and factory power distribution systems.

The Eimco Corp. has new quarters in New York City at 51-52 South Street.

National Mine Service Co. announces completion of a new modern headquarters building at Beckley, W. Va. In addition to executive offices, the new structure houses the general offices of the Bemeco division of the company.

John Ireland, director, Tin Research Institute, London, England, announces the formation of Tin Research Institute, Inc., an American corporation devoted to providing free technical service to U. S. tin consumers. The Columbus, Ohio office will handle all requests for technical service, while a sponsorship will be maintained at Battelle Memorial Institute to handle new researches.

The Ritter Products Corp. has been taken over by the Quaker Oats Co., which will continue development of the Johnson process of electrostatic separation under the direction of its mechanical research division.

The Beryllium Corp., Reading, Pa., announces formation of a new corporation, Beryllium Development, Inc., which has been organized to buy, sell, and mine domestic beryl ore.

H. N. How, president, Western Machinery Co., announces the appointment of Leigh Jones as manager of the company's industrial sales branch office at Denver, Colo.

John A. Plimpton has been appointed division manager of the Pennsylvania Crusher Co., Philadelphia, : division of Bath Iron Works Corp.

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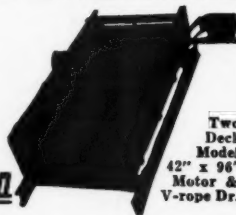
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